Instrumentation Scientifique de Laboratoire

FPP 5G & FPP 5Gs
User manual

Instrumentation Scientifique de Laboratoire - BP 70285 - 14653 CARPIQUET CEDEX FRANCE
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Revisions historical

Revision index	§ concerned	Modification descriptive	Date
A		Creation	00/04/01
B	Part 2 § 6.2, 7.4, 7.5 ; 8.9	Software update to version 2.3: Jacket temperature checking procedure (Quality menu); addition of a memory resetting key (Configuration menu), spare parts list adding.	02/06/18
C	General § 6.2	Welcome screen: language selection at power on	03/07/11
	Part 1 § 2.4.2	Assisted edition function	
	Part 2 § 4.6	Printer configuration menu	
	Part 2 § 5	Program parameters configuration menu: detection parameters for up and down time added	
	Part 2 § 8	Alarms treatment with historical	
	Part 2 § 9.1	Configuration menu of power on parameters	
	Appendix A	Printout examples updated	
	Appendix B	Description of the communication protocol of the RS 232C link	
D	Part 1 § 2.5	Modification of the ***Jacket Preparation*** menu	03/11/06
	Appendix D	Manual mode available	

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CUSTOMER REPORT

Reserved for public relations department
N° .....
Date .....

PURPOSE

I wish to
- ☐ Report an error
- ☐ Submit a suggestion / a comment
- ☐ Get more information

In the area of ☐ Hardware ☐ Software ☐ Manual

ANALYZER ENVIRONMENT (please be complete)

• HARDWARE Type of analyzer: .....

Serial N° : .....

Options:
- ☐ Parallel printer
- ☐ Graphic printer
- ☐ Plotter
- ☐ RS232C interface
- ☐ Current loop interface
- ☐ Other : .....

• SOFTWARE Version : .....

ATTACHED SHEETS

☐ Listing ☐ Diskette ☐ Drawing ☐ Text ☐ Other

PROBLEM DESCRIPTION / COMMENTS

SUBMITTED BY

Name :

Company :

Address :

Phone : Fax : Date:

Send this report to your local Sales office or to Groupe ISL - Service Clients
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Caution

This ISL analyzer has been carefully designed, manufactured and inspected for quality. It has been equipped with a number of safety features.

However, the use of this analyzer may involve the handling of solvents, chemicals, and other potentially dangerous flammable, toxic, etc.) materials. Please exercise caution when- handling these materials while operating the analyzer.

Please:

- *read the manual*
- *wear proper protective clothing*
- *perform all suggested service procedures*
- *use care to prevent accidents.*

The manufacturer accepts no responsibility for any damage or liability arising from the use of analyzers.

Use of Non-ISL Products and Accessories: Defects or damage that result from the use of Non-ISL branded or certified Products, Accessories, Software or other peripheral equipment are excluded from warranty.

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Contents

General

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1. Introduction

1.1. ISL company profile

We would like to take this opportunity to thank you for choosing ISL product. We are confident that you will be completely satisfied with your new Analyzer and we hope that you continue to call on us for all of your laboratory's petroleum testing needs. Before you begin, we ask you to take a few minutes to become acquainted with ISL and its history.

ISL's beginnings go back to 1975, when a group of engineers and scientists from the heart of the Northern France's petrochemical industry began seeking ways to automate petroleum testing. The neighboring industry served as an excellent research and development proving ground for their new equipment.

By the end of 70's, several quality instruments had been developed and were being marketed in Europe under ATPEM Trademark.

The most famous of these new instruments was the CPP 97, Automatic Cloud and Pour Point Analyzer. Introduced in the early 1980's, its successor, the CPP97-6, revolutionized cold flow testing enabling up to six tests automatically and simultaneously.

Adding new automatic instruments each year, ATPEM soon became a world-wide leader in automatic petroleum test instrumentation. In 1986, they expanded operations, reorganizing into the company now knows as ISL.

Striving to maintain close contact with customers in over 75 countries, ISL has since grown, founded Sales & Service branches on each continent. With design, marketing, service and support operating together under the ISL roof, the company reached "a new dimension" in 1993 by obtaining ISO 9002 certification from the BVQI. Working hard to extend our quality assurance program, we received ISO 9001 certification in 1995.

Though best known for distillation, viscosity testing, cold behavior instrumentation, flash point, evaporation loss, oxidation, and asphalt testing equipment, ISL's contributions to automated petroleum testing continue to grow. With more than 10 patents to date, ISL's constant research into new technologies buttresses our precedent for ultimate precision, performance and safety. The company now offers over 20 Automatic Analyzers for different applications giving incontestable benefits to its users in increasing of test precision by elimination of operator subjectivity and human errors, while increasing productivity and reduce operator time with highest level of safety.

A worldwide distribution network supports our customers with quick, efficient service, and our highly knowledgeable service staff buttresses this relationship, providing solutions to product or application challenges.

Please visit our web site for more information: http://www.isl-france.com .

1.2. Typographical conventions

Convention	Meaning
Bold	Important words or phrases
Bold Italics	Menus or buttons on the LCD
Bold + SMALL CAPITALS	Keys on the front panel of the device

1.3. About this manual

This manual is made up of two main parts, entitled:

1. Part 1: Using the FPP 5G with the pre-installed program.
2. Part 2: Advanced use of the FPP 5G

The first part allows the operator to carry out an initial plugging test with the FPP 5G in a few stages, confidently and with no particular prior knowledge.

The second part, on the other hand, makes it possible to use the FPP 5G's potential to the full. It is, therefore, intended for the knowledgeable user who is familiar with low temperature plugging tests. In any case, the sensitive parts of the FPP 5G control software, those linked to the test parameters, can be read & write-protected by a system of passwords chosen by the user.

There are two FPP models:

- The FPP 5G, an external cooling analyzer.
- The FPP 5Gs, a built in cooling analyzer.

The two models are similar and will be described as one (FPP 5G/s) throughout the manual. However, the special characteristics of each model will be explained where necessary.

2. Type of analyzer

The FPP 5G makes it possible to determine the filterability limit temperature of medium distillates, including those containing fluidification agents and other additives. It will be recalled that the filterability limit temperature, or CFPP, is the highest temperature at which a given device when it is subjected to cooling in standard conditions (ref. NF EN 116).

The special feature of the present device is that it is very multi-functional, in that all its parameters can be re-set. It can thus, over and above the program governed by the NF EN 116 standard (standard pre-installed CFPP test, as well as four other programs) run programs based on the personalized parameters and linked to the needs of the user. This major trump card allows the device to be used not only for the usual tests but also in the R & D area. What is more, this multi-functionality has not been achieved at the expense of ease of use. Indeed, as we shall see in the following chapters, the multi-functionality of the device is equaled only by ease of use.

Finally, it should be noted that the device has an electronic vacuum regulation system, which significantly improves the accuracy of the tests and considerably reduces the weight, fragility and complexity of the device.

ISL has taken great care with the design and manufacture of this device and hopes it will give you every satisfaction.

3. Care in use

3.1. Meaning of symbols

Note ***Important comment.***

ATTENTION ! ***Call for particular care.***

Referral ***Referral to a particular document (Standards) or to another manual.***

3.2. Care in the use of testing and cleaning equipment

It is supposed that operators are familiar with the handling of hydrocarbon products and that they are thus aware of the dangers and risks that attach to them.

3.3. Precautions to take when using built-in cooling analyzers

Built-in cooling analyzers comprise a cooling compressor that necessitates several special precautions to be respected for the long life of the analyzer and its optimum performance:

- Avoid using the analyzer on a vibrating surface. Surface vibrations can enter into resonance with those of the compressor and cause damage to the analyzer.

- The optimal operating temperature for the analyzer is around 20°C. To avoid harmful overheating of the unit:

1. Keep the rear of the unit clear to allow heat to escape easily.

2. Keep the ventilation holes in the side of the unit clear. They must be regularly blown clear of dust to avoid clogging and possible blocking.

4. Unpacking and installation

4.1. Care in unpacking

After unpacking, check the device and its accessories as well as any possible damage sustained in transit, which must immediately brought to the attention of the carrier so that a statement of damage can be made.

The various parts of the FPP 5G/s are carefully checked and tested before shipping. Nevertheless, it is worth checking that the equipment received corresponds to the packing list enclosed.

On taking delivery of the FPP 5G/s, unpack all these parts.

Put the analyzer on a work bench near electrical sockets and connections to cold sources. Allow enough space for access to the rear connectors.

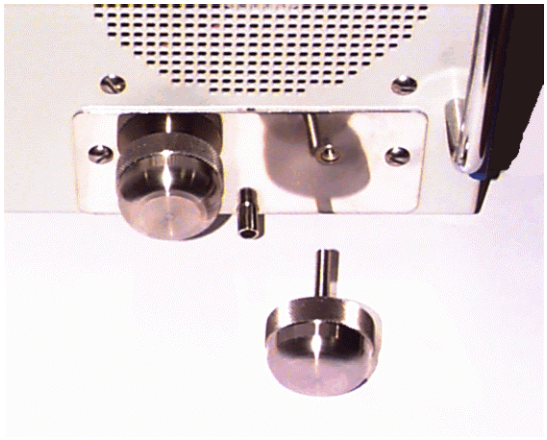
4.2. Installing the FPP 5Gs: unlocking the shock-absorber

The FPP 5Gs cooling compressor is mounted on a shock-absorber that must be locked during transportation. The shock-absorber is locked by bolts that screw in underneath the unit. To ensure that the bolts are removed after transportation the unit will not sit flat on its base until they are removed.

When unwrapping the unit:

1. Remove the shock-absorber locking bolts from underneath the unit.
2. Screw them into the special storage panel at the back of the unit as shown below.

Shock-absorber locking bolt



Special storage panel for shock-absorber locking bolts.

Figure 1: Locking/unlocking the shock-absorber

4.3. Connections

4.3.1. Connecting to the electric power supply

After unpacking the FPP 5G the different extensions need to be connected and it should be plugged into different networks and circuits.

Regarding the connection of the FPP 5G/s to the mains, it should be noted that the device is built to operate from 90 to 130 Volts and from 180 to 250 Volts, at 50 or 60 Hz, in accordance with the majority of countries where the device is marketed. The power cable corresponding to the country of sale is supplied with the device.

4.3.2. Connecting the analyzer to the cooling circuit (FPP 5G)

There are two nozzles for this purpose at the rear of the device (see the photograph in Figure 2, page 17). When connecting, pay attention to the inlet and outlet markings (indicated on the nozzle support).

Refer to the ISL specifications for further details of the characteristics of the coolingunit.

4.3.3. Connecting the printer

A parallel port is provided at the back of the analyzer for connecting a printer compatible with the Analyzer (using ESC/P language) with which to print out test results, among other things.

> ***Caution! The Analyzer and peripherals must be switched off before connecting any new peripherals.***

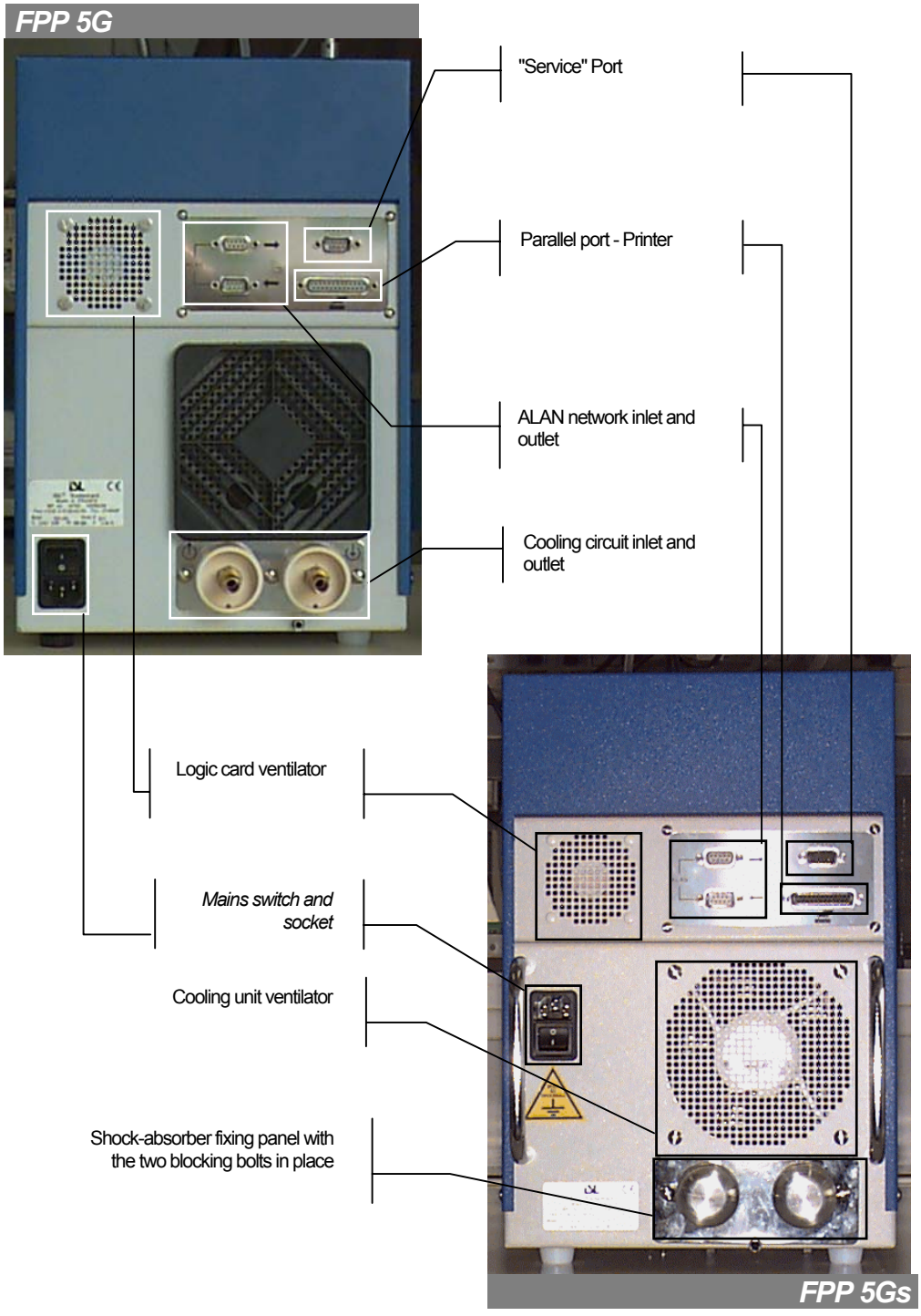


Figure 2: Rear panels and connections

4.3.4. Sample temperature probe connection

1. Connect the sample temperature probe DIN plug to the corresponding socket on the front panel of the device.
2. Insert the probe in the probe-holder on the upper part of the device .

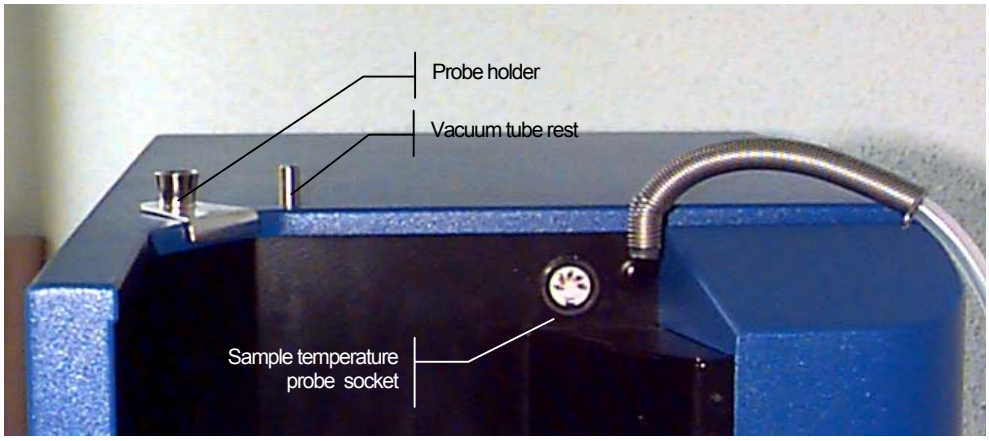


Figure 3: Sample temperature probe connection

4.3.5. FPP 5G/s / PC link

The FPP 5G/s Analyzer is fitted with an RS232C interface and an RS485 interface as standard.

4.3.5.1.Connection to the Alan® network (RS 485 link)

The Alan® network allows among others one or more devices to be run by a PC using software specially developed by ISL. The connection to the Alan® network is done by means of two ports (input/output) in the back side of the Analyzer (see Figure 2 page 17).

Refer to Alan® Software installation manual and follow on line help available.

Note: The RS 485 communication mode has to be parameterized. Refer to the Part 2 section 9.7.2 - Setting up the PC link: "PC Link" menu page 2-71.

4.3.5.2.RS 232 C link

The Alan® network input / output ports may be connected via a special adapter supplied with the analyzer to form an RS 232 C serial link enabling results to be collected to the delimited ASCII format on a PC or on any other computer system and for transmission to a LIMS.
Use the adapter supplied (see the Packing List): it has two RS 485 connectors on one side, which have to be connected simultaneously to the Analyzer's Alan input and output, and on the other side an RS 232C connector to be connected to the PC.

Note: The RS 232C communication mode has to be parameterized. Refer to the Part 2 section 9.7.1 - Setting up the RS232C link: the "RS232" menu page 2-70.

Refer to the Appendix B - RS232 link features on FPP 5G/s page 85 for the link characteristics, the description of the communication protocol and the meaning of the messages and .

4.3.5.3.The "SERVICE" port

The FPP 5G/s has a serial « SERVICE » port as a standard fitting with which, with the help of the « ISL UDS » maintenance software supplied, software updates can be downloaded via a PC and the contents of the memory such as the internal parameters and results can be saved for subsequent reloading (refer to the Part 2 section 9.9.4 - File upload/download commands: the "UDS" menu page 2-73).

5. Description of the device

The FPP 5G/s consists, broadly speaking, of two major parts:

- The user interface.
- The filtration bank and the electronic and mechanical parts linked to it.

The user interface will be the subject of the next paragraph.

As regards the filtration bank, we will here only deal with the parts handled by an operator in the context of an CFPP test (or one of the other four tests pre-installed in the device memory at the factory).

The equipment necessary for a CFPP test (in direct contact with the sample) is strictly compliant with the current standard.

The FPP 5G/s consists of:

1. A cylindrical, flat bottomed, transparent glass **Testing tube** with a permanent mark corresponding to a volume of 45 ml; designed to contain the sample.

2. A flat bottomed brass cylinder forming a sealed air bath, called (in compliance with the standard) a **Jacket**, designed to contain the Testing tube, so as to heat and cool it. In the case of the FPP 5G/s, the Jacket is of a piece with the **Cooling bath**. To maintain this bath at the desired temperature, the FPP 5G must be linked to a coolingunit, in order to keep to the requirements of the current standard.

3. So as to insulate the Tube from the Jacket (since the temperature change must occur across the air bath and not by contact), there is a one-piece assembly consisting, from bottom to top, of an **Insulating ring** and two **Ring wedges**. **The insulating assembly** is made of an oil-resistant plastic material; the different parts are held together by stainless steel rods.

4. A **Stopper** adapted to the testing tube by means of clips (ISL improvement).It is made of an oil-resistant plastic material (see Figure 7 on page 1-26).

5. A **pipette** and **filtration assembly**, strictly compliant with the current standard (see Figure 9 on page 1-27).

6. A standardized and calibrated **Temperature probe**.

7. Finally, a **Vacuum source** equipped with an electronic **Vacuum regulator**.

- Refer to the text of standard NF EN 116 for further details.
- See on Part 2 section 7 - Adjustment and calibration: the "Quality" menu on page 2-57 for the temperature probe calibration procedure.

6. The user interface

6.1. Front panel

The front panel of the device appears thus:

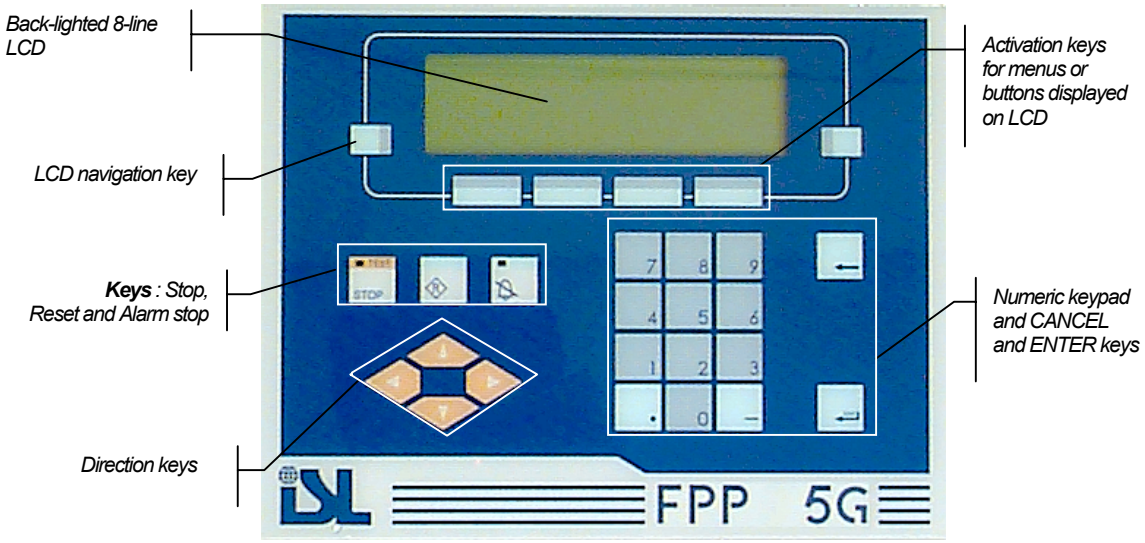


Figure 4: Front panel.

6.1.1. The LCD screen

The front panel of the device therefore includes an 8-line LCD which may be represented thus:

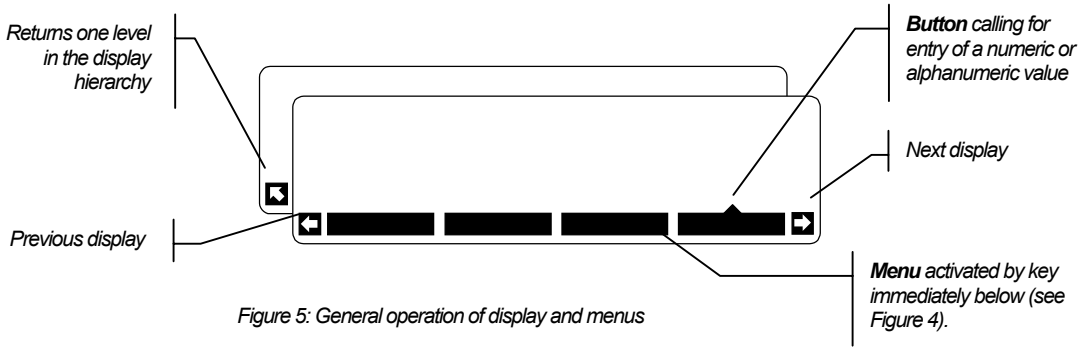


Figure 5: General operation of display and menus

On either side of this display, two keys make it possible to travel up and down the hierarchy of screens (activate the **NEXT SCREEN** and **PREVIOUS SCREEN** keys – see Figure 3). In the lower part of the display, there are four keys by means of which the menus displayed on the display can be activated.

6.1.2. Backlight setting

The LCD screen backlight is set by a combination of the **ENTER KEY** and the high **DIRECTION KEY** for less contrast and low **DIRECTION KEY** for more contrast (refer to the next section).

Note: The intensity of the backlight can change according to the ambient temperature.

6.1.3. The control keys

The lower left hand side of the front panel is taken up by three keys, namely:

STOP/TEST: To stop a test or any other operation
If the LED is lit up, this means that a test is in progress.

RESET : To cancel and go up through the display/menu hierarchy

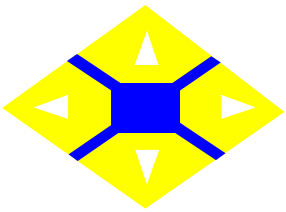
Interrupts the audible alarm signal. (**ALARM STOP**)
If the LED is lit up, this means that a problem has arisen. Pressing on this button will give the error message content.

The rest of the front panel is occupied by a numeric keypad equipped with a **CANCEL KEY** and an **ENTER** key:

ENTER key: validate an input of variables.

TO CANCEL characters.

Finally, in the lower left hand section, there are four direction keys used to move around a text field and select characters to enter variables (e.g. name of sample).



DIRECTION keys.
Scrolling of test result suctions.

6.2. Welcome display and language choice

When the analyzer is switched on, the welcome screen is displayed. If it does not, first check the backlight settings (see section 6.1.2 on the previous page).

This screen provides information about ISL and two menus offering the choice of language.

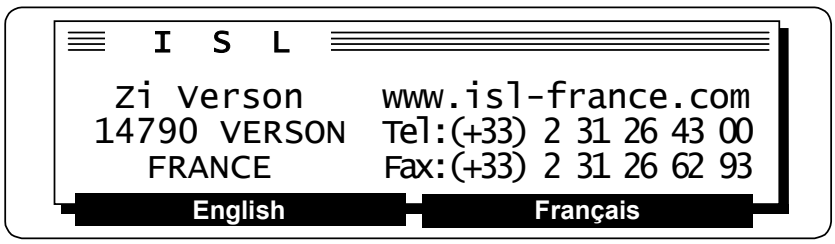


Figure 6: Welcome display.

This display remains active until the key corresponding to the language of your choice is pressed. Doing this activates the display 1 of the ***CFPP Run/Start*** menu (see Diagram 1 page 1-25).

Note: You can disable the language choice as part of the startup parameters (refer to the Part 2 section 9.1 page 2-66). If the choice is locked, press any key on the front panel.

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Part 1

Use of the FPP 5G/s with pre-installed programs

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1. Introduction

The multi-functional nature of the FPP 5G/s is shown, as discussed previously, by the fact that it is possible to carry out, over and above tests complying with the current standard (in this case standard NF EN 116), a personalized test programs based on specific inputs.
In this part, we will focus on a standard test, i.e. the CFPP test. This test is, along with four others, pre-installed at ISL. They are saved in a memory that is very easily updated (e.g. to change a name) by downloading from a PC via the ALAN network.

2. The first test

In this chapter we will deal with a CFPP standard test carried out with the FPP 5G, stage by stage. We will, however, only describe the menus that are strictly necessary for the successful operation of the test. We will further assume that the operator has taken due note of the care that needs to be taken with the substances tested and of cleaning products.

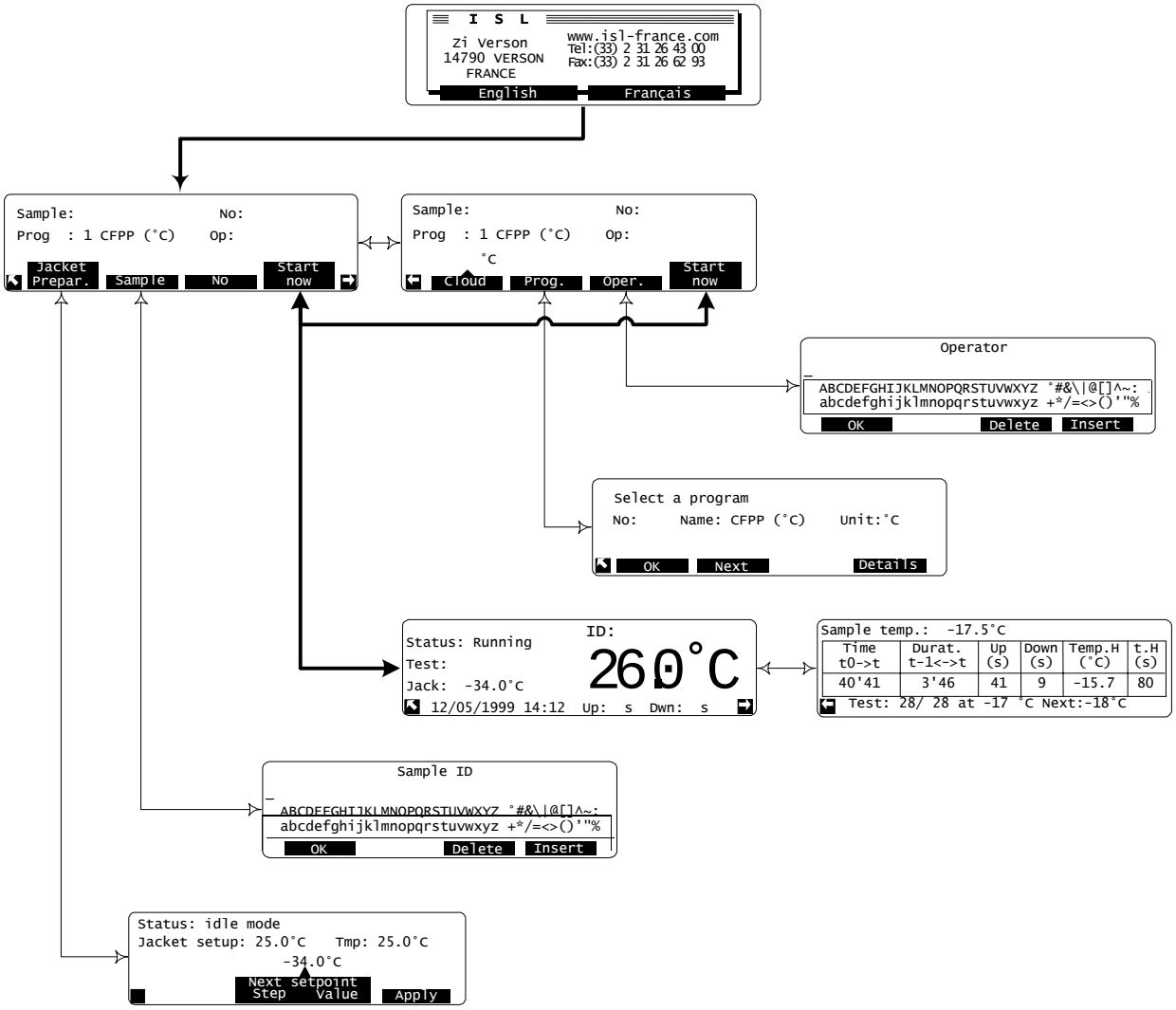

Diagram 1: Starting a test.

2.1. Preparing a sample

Before initiating the test phase, a sample must be prepared. It will be remembered that the FPP 5G/s is intended for medium distillates and is not suitable for other hydrocarbons.

Procedure:

1. By means of a non-fluffy paper filter (products certified with reference number – standard NF EN 116), about 50ml of the sample at the laboratory's ambient temperature, but in any case not below 15 C° (ref. Standard NF EN 116).
2. Pour the sample thus filtered into the empty testing tube, as far as the permanent level marking (a volume equivalent to 45ml).

2.2. Assembling the filtration and measuring assembly

The filtration and measuring assembly is assembled as follows :

Procedure

1. Insert the pipette into the stopper as shown in Figure 7 and Figure 8 see above.

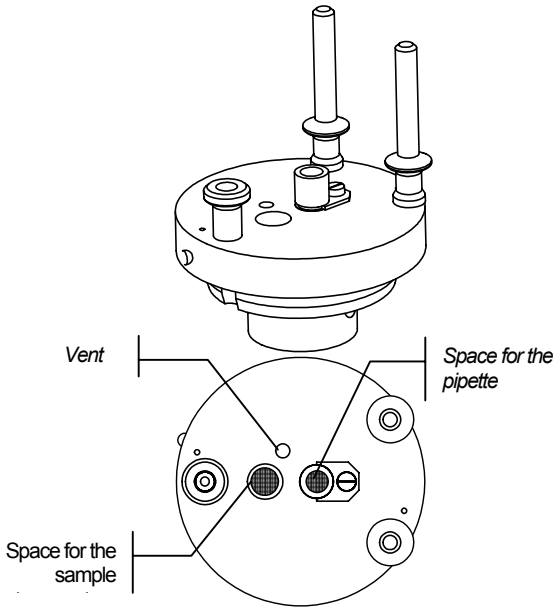

Figure 7: Stopper, 3D view and view from above

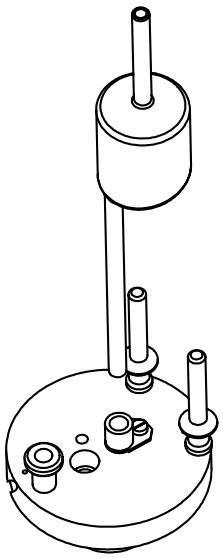

Figure 8: Positioning of the Pipette on the stopper.

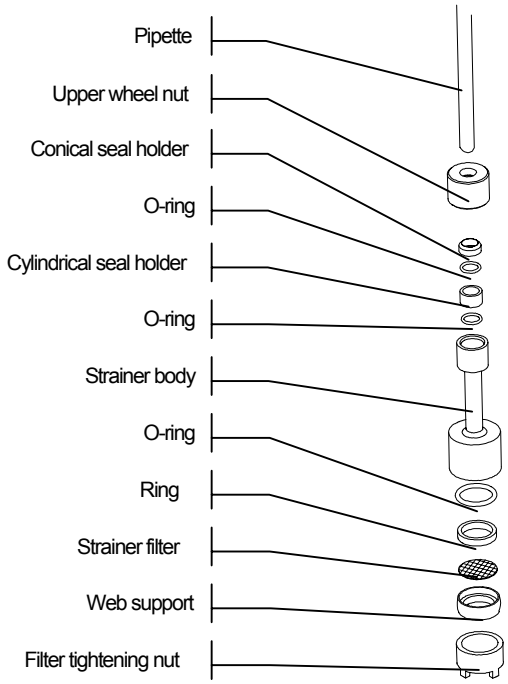

Figure 9: Assembly of filtration assembly, with parts list.

2. When the pipette is introduced into the stopper, insert into it: The upper wheel nut, the conical seal holder, the first O-ring, the cylindrical seal holder and the second O-ring, before introducing the assembly into the strainer body and tightening. Assemble the rest of the filtration assembly as per Figure 9 on page 1-27.
3. Put the filtration assembly into the testing tube, having previously filled it.
4. Carefully push the filtration assembly-pipette-stopper assembly into the testing assembly until they clip together. To remove the stopper, push in the direction opposite to that used to achieve mounting. Make sure that the filtration assembly is right at the end of the testing tube.
5. Fix the vacuum pump tube at the free end of the pipette.
6. Place the measuring assembly (consisting of the pipette, the stopper and the filtration assembly) into the receptacle intended for this purpose, to the right of the jacket and called the Measuring Head Port.

2.3. Characterization of the sample

When the device is switched on, the welcome display per Figure 6 page 21 is displayed. By pressing on the **STOP/TEST** key on the front of the device, the following display appears thus:

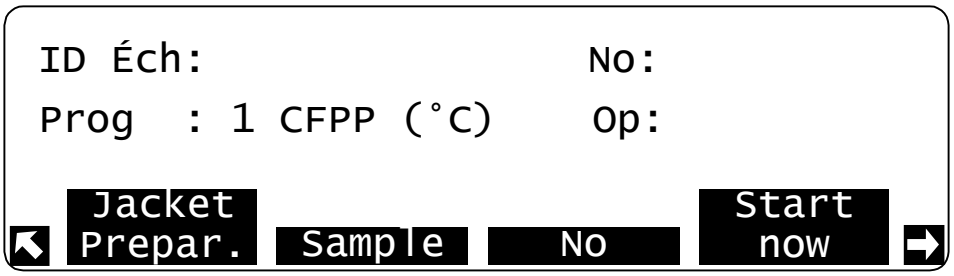

*Figure 10: Display 1 of the **FPP Run/Start** menu.*

There are two points to be made in this respect :

- ***After switching on the device, the display of the*** FPP Run/Start ***menu above is obtained after the language has been chosen or by pressing any key on the front panel if the language has been locked.***
- ***This screen is not placed hierarchically after the Welcome display. The arrow on the left bottom of the display, the PREVIOUS LEVEL key (refer to the section 6.1.1 page 20), allows backing up on the main screens level (refer to the Diagram 2 page 2-37).***

These measures have been taken to <u>accelerate</u> access to test-related menus.

Display 1 of the ***FPP Run/Start*** menu contains the following information:

- Sample : identifying name of the sample
- No : sample number
- Prog : the program being used and the unit used for temperature measurement.
- Op : name of the operator
- The following menus and buttons:
  - ***Jacket Prepar.***: jacket preparation menu
  - ***Sample:*** *Sample ID entry button*
  - ***No:*** *Sample number entry button*
  - ***Start now:*** *Start test button*

Display 2 of the ***FPP Run/Start*** menu, accessible via the next display button, has, in its upper part, the same fields as the previous screen, and these buttons in its lower part :

- **Cloud :** Button for cloud point entry.
- **Prog. :** Program selection menu.
- **Oper. :** Operator name entry button.
- **Start now:** Start test menu.

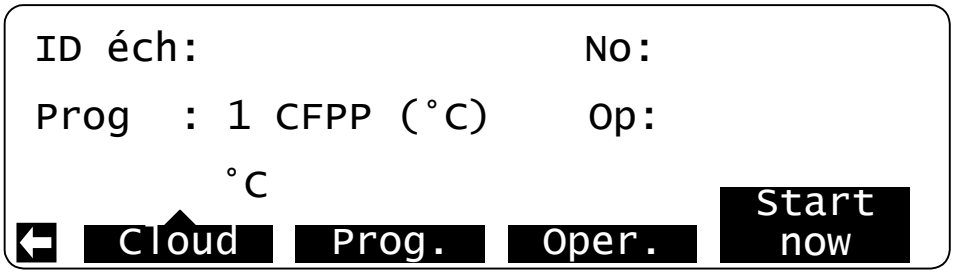

*Figure 11: Screen 2 of **FPP Run/start** menu.*

With the ***Cloud*** button in display 2 of the ***FPP Run/Start*** menu, the sample cloud point temperature can be entered directly by means of the numeric keypad. In fact, if the cloud point temperature is known, the test could start with that plus x°C (x being a program parameter - $x \geq 5$°C for a standard CFPP test).
The ***Prog.*** button gives a choice of factory pre-installed programs. Activating the ***Prog.*** menu displays the following screen :

*Figure 12: Display 1 of the **Prog.** menu.*

To select the desired program, activate the ***Next*** button as many times as necessary. When the desired program is displayed, activate the ***OK*** button.

The FPP 5G/s has 5 programs pre-installed at the factory. These programs are:

1. CFPP (°C) : Standard CFPP test – Unit of temperature measurement °C.
2. Simul (°C) : Filterability test with constant rate of cooling of jacket - Unit of temperature measurement °C.
3. CFPP (°F) : Filterability test - Unit of temperature measurement °F.
4. Simul (°F) : Filterability test with constant rate of cooling of jacket - Unit of temperature measurement °F.
5. CFPP (°C) : Memory area for priority use for downloading programs from a PC.

All these programs are entirely modifiable (provided there is the necessary authority to do so).

2.4. Text entry display

2.4.1. Text entry

This display is typical of text entry displays. It is found at all points and is essentially made up of two parts:

- A **variable** part, on the upper part of the display, which is the name of the field.
- A **recurrent** part (whatever the field is) consisting of an alphabetic table (from which the characters to be entered are selected) and three buttons: ***OK***, ***Delete*** and ***Insert*** .

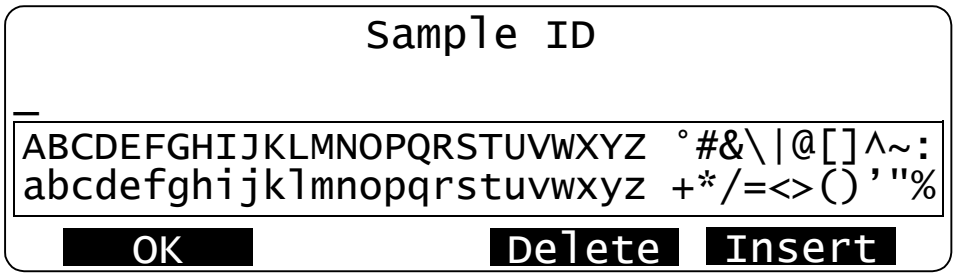

Figure 13: Text entry screen. The field concerned is the sample identifying name (sample ID).

The characters are entered in the following way:

1. On the entry display, a black rectangle flashes on the first letter of the table ("A"). To select a letter, use the direction keys on the front panel. Press the key as often as necessary (or keep the finger pressed on it) to indicate the direction of the character sought.
2. When the flashing rectangle is positioned on the character sought, press the **ENTER** key on the numeric keypad. If the character is incorrect, cancel it with the **CANCEL** key.
3. If there is a mistake in the string of characters entered, use the direction keys and the ***Insert*** and ***Delete*** buttons to remedy it.
4. Finally, validate with the **OK** button.

Proceed in similar way for the operator name.

After validating (by means of the ***OK*** button in the text entry display), the initial display returns automatically to the display 1 of the ***Run*** menu (see Figure 10, page 1-28). The same is true at each entry of text variables by means of the text entry display.

2.4.2. Assisted edition

To speed up test starting the text entry screen enjoys a semi-automatic input feature: the latest text inputs are stored in memory so that the operator only needs to enter the first two or three characters for the whole to be displayed.

If the function ***Auto Edition*** is activated, the Analyzer proposes a suite when characters are entered according to prior enters. This function is intended for accelerate test initiating and it can be configured or deactivated (refer to the Part 2 section 9.1 page 2-66).

2.5. Preparing the Jacket

As indicated previously, in the FPP 5G, the jacket is of a piece with the cooling bath. Preparation of the jacket consists of lowering the temperature to the first step of the cooling profile adopted, e.g. for a standard CFPP test (ref. standard NF EN 116), this step is at the temperature of -34 ± 0.5 °C. The jacket can also be re-heated, if necessary, up to a maximum of +50°C.

Procedure :

1. From the display 1 of the ***FPP Run / Start*** menu (see Figure 10 page 1-28), activate the ***Jacket Prepar*** menu. The following display then appears :

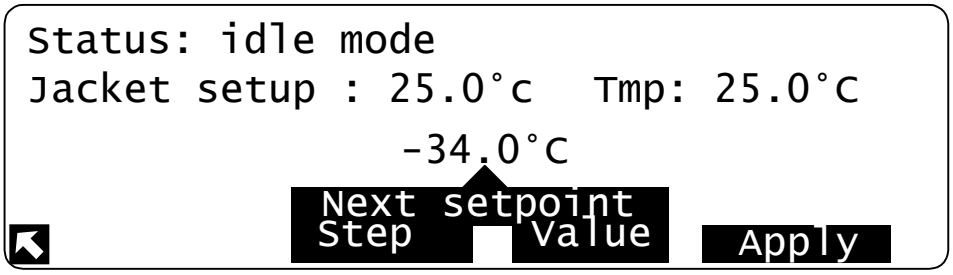

Figure 14: **Jacket Prepar**. *menu display.*

2. The control program searches in the cooling profile of the program previously selected (see section 2.3 page 1-28) for the first step jacket setting and displays it. If the setpoint displayed meets the requirement of the tests, press the **APPLY** key. The temperature setpoint is then displayed in the "Jacket setup:" field and the real jacket temperature appears in the "Tmp:" field.
   It is possible to go directly to the following step by pressing the **STEP** key (only after the first step was applied).
   If the cooling profile does not include a jacket step, you will have to enter the desired temperature. Press the **VALUE** key of the ***Next setpoint*** menu. Enter the temperature value of the desired step using the numeric keypad, and validate with the **ENTER** key.
3. Initiate preparation of the jacket by activating the **APPLY** button. Otherwise activate the **PREVIOUS LEVEL** button (the arrow on the left bottom). The effect of both these actions is to re-establish display 1 of the ***FPP Run / Start*** menu (see Figure 10 page 1-28).

Do not forget to place the cover on the jacket so as to avoid condensation of water vapor inside it.

When the jacket has reached the set temperature, an audible signal is given.
If for any reason the preparation of the jacket must be stopped, simply press on the **STOP/TEST** button on the front panel of the device. The control software will ask for confirmation of the command on the following display:

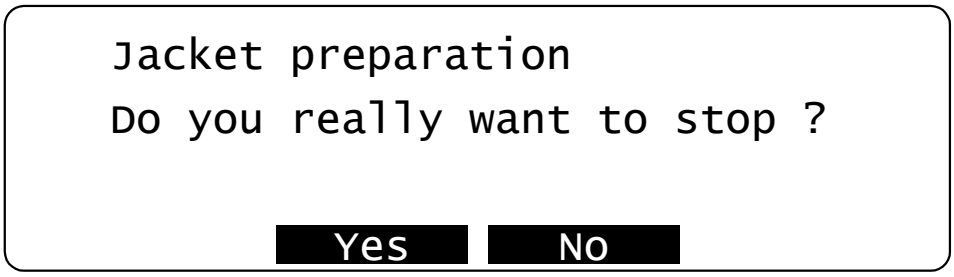

Figure 15: Confirmation that jacket preparation is to be cancelled

Confirm or cancel the command by activating the ***Yes*** or ***No*** buttons respectively***.***

To gain time, the Jacket preparation stage can be carried out first before even preparing the sample and assembling the filtration assembly.

2.6. Initiating the test

After the audible signal for the end of the preparation of the jacket is sounded, carry out following operations:

Procedure

1. Remove the Jacket cover.
2. Place the insulating assembly at the bottom of the Jacket.
3. Remove the measuring assembly from the receptacle and place it in the Jacket.
4. Activate the ***Start now*** menu.

If all the stages have been carried out correctly, the display below will appear.

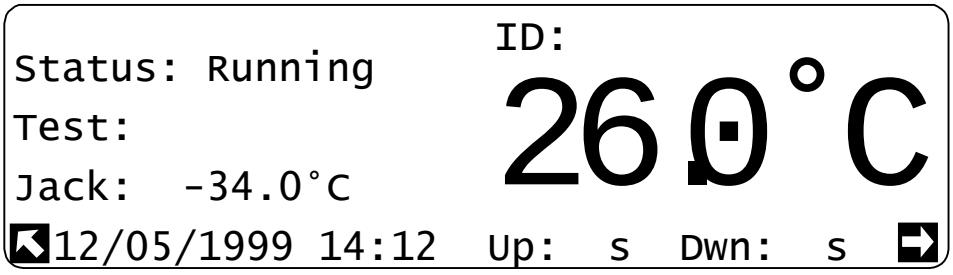

*Figure 16: Display 1 **Start now** menu.*

This display carries the following information :

- ID : Sample identification name
- Status : Operation under way, on this case the test is running.
- Test : During the test this field indicates the temperature of the sample at which the forthcoming suction will be carried out.
- Jack : Jacket temperature.
- Current date and time.
- (In large characters) The sample temperature given by the probe.

This screen gives access, by means of the ***Next Display*** button, to another display on which the progress and details of the current test may be followed in real time.

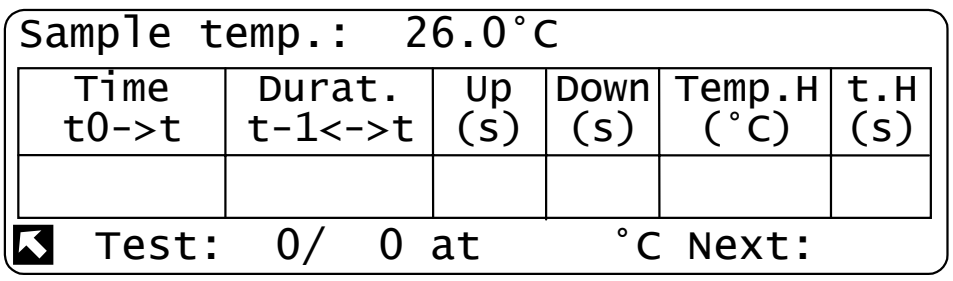

*Figure 17: Display 2 **Start now** menu.*

Display 2 of the ***Start now*** menu has the following components :

- Sample temp.: Temperature of the sample. This field is refreshed in real time.
- Time t0->t: Cumulative time from the 1st suction.
- Durat. t-1<->t: Time interval between two suctions.
- Up (s): Duration of the rise by suction of the sample in the pipette.
- Down (s): Duration of the descent of the sample in the testing tube.
- Temp.H (°C): Maximum temperature attained by a sample in a test.
- t.H (s): Time needed to attain temperature Temp.H from the beginning of the current suction.
- Test: __/__: Number of the suction displayed over the total number of suctions. In testing, it is always the last suction that is displayed.
- at __°C: Temperature of the sample at the moment of suction.
- Next:: Temperature at which the next suction will be carried out.

Sample temp.: -17.5°C

Time t0->t	Durat. t-1<->t	Up (s)	Down (s)	Temp.H (°C)	t.H (s)
40'41	3'46	41	9	-15.7	80

Test: 28/ 28 at -17 °C Next:-18°C

Figure 18: Example of test.

The FPP 5G/s will carry out, in accordance with the standard, a suction at each lowering of the temperature by 1°C.
If the cloud point temperature is known, the FPP 5G will undertake the first test at this temperature plus 5°C. If not , the first suction will be performed when the sample temperature reaches 10°C.
If the filter is not choked when the sample has reached a temperature of –20°C (the temperature of the jacket being -34 ± 0.5°C), the FPP 5G/s will automatically lower the Jacket temperature to (-51 ± 1)°C (second step).
If there is still no choking when the temperature has reached -51°C (third step), the FPP 5G/s control software stops the test in accordance with the standard.

These parameters are those of the standard CFPP test (ref. NF EN 116). However, they may be modified on condition that the necessary access authorizations have been given.

The personalization of the parameters, and the display and printing out of results will be dealt with in the second part of this manual.

2.7. Cleaning the equipment

At the end of each test the measuring assembly must be cleaned. This can be done manually or automatically. In fact, the FPP 5G has two automatic cleaning programs. The programs are accessible from the ***Cleaning*** menu:

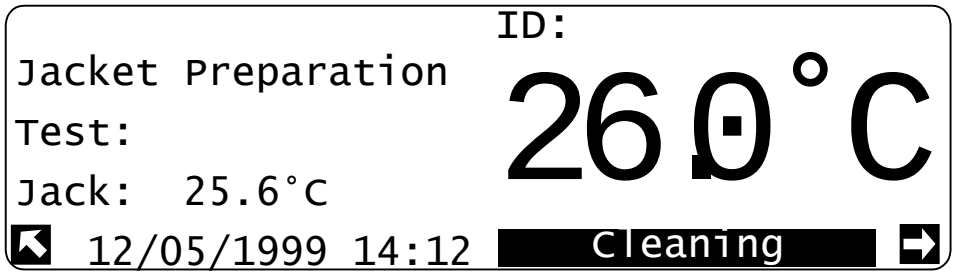

Figure 19: Display 1 of the FPP Run/Display menu

The Cleaning menu is not accessible during testing.

2.7.1. Cleaning by hand

Manual cleaning is recommended by the standard (see Standard NF EN 116) and consists of complete disassembly and cleaning of the filtration assembly.

Before each test it is* necessary *to check the condition of the filter. Choking of the filter by paraffin crystals or other impurities may cause erroneous results.

Procedure

1. Disassemble the filtration assembly completely (see Figure 9, page 1-27).
2. Clean the filtration assembly, the pipette and the testing tube with a solvent appropriate to the nature of the sample tested.
3. Dry the different parts carefully.
4. Check the condition of the filter.
5. Reassemble the assembly (see Figure 9, page 1-27).

The measuring assembly is now ready for use again.

If the metallic filter remains clogged after this treatment, it is advisable to change it.

2.7.2. Automatic cleaning

To initiate an automatic cleaning program, follow the procedure below:

Procedure

1. Fill two containers, of a base wide enough so that they are not unbalanced by the measurement assembly (about 400 ml, similar to those constituting the measuring assembly receptacle), with two different solvents: one for washing and the other for rinsing, in accordance with the products tested and the degree of cleanliness desired.

It is assumed that the operator has taken all the precautions associated with the use of solvents

2. Remove the temperature probe from the stopper and put it in the probe port in the upper part of the device (See Figure 3 on page 18).
3. Unclip the testing tube, which is to be cleaned separately .
4. Activate the ***FPP Run/Display*** menu, then the ***Cleaning*** menu, to call up the display below:

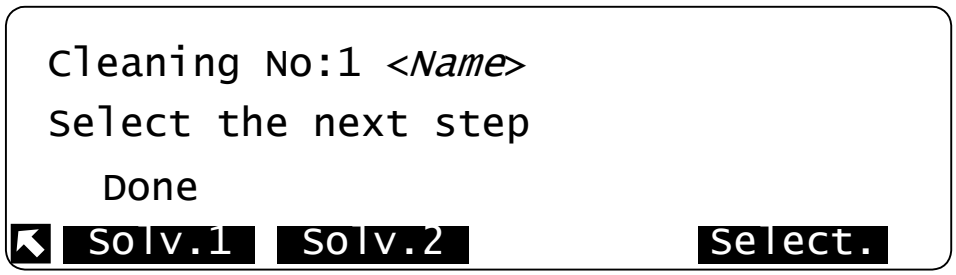

Figure 20: Display 1 of the Cleaning menu

This display includes in its upper part the number of the automatic cleaning program in progress. Here it is program N° 1. In the lower part of the display, two buttons give access to the two stages of cleaning and a third, ***Select***, allows a cleaning program to be selected and displayed. Completion of each stage will be indicated by "Done".

5. Immerse the measurement assembly in the container of the first solvent, and validate by activating the ***OK*** button of the display below. Otherwise exit by means of the ***Exit*** button:

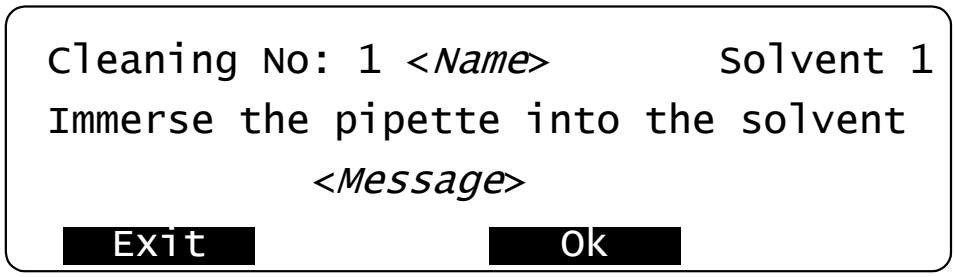

Figure 21: Display 1 of the Solv.1 menu

Modification of the <Message> and <Name> fields are dealt with in Part 2 section 11 - Cleaning programs: the "Clean." menu page 2-77.

After validating, the following screen appears :

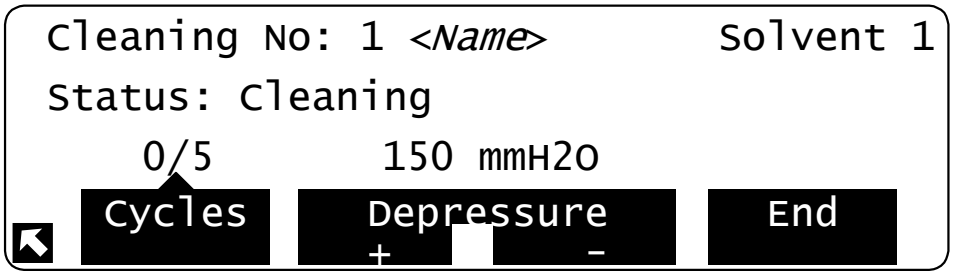

Figure 22: Display 2 of the Solv.1 menu

This display includes the following components:

- The number of the current program (permanent field).
- The current stage.
- The status, cleaning in progress.
- The number of cycles; this field may be modified directly by activating the ***Cycles*** button, in the course of cleaning.
- Pressure reduction applied for suction of the solvent. This field may also be modified directly in the course of cleaning, to allow the height of the solvent rise to be adjusted and the filtration assembly only to be cleaned, or the whole measuring assembly by further reducing the pressure.
- With the ***End*** button the current cleaning stage can be definitively ended.

At the end of this stage the display in Figure 20 on page 1-34 appears. For solvent 2 exactly the same procedure is followed.

At the end of each stage of the cleaning process, an intermittent alarm tells the operator that the operation has finished.

A second program is available. This may be useful if there is a change in the type of sample, for example, which might imply the use of different solvents and so a different number of cycles.

Part 2
Advanced use of the FPP 5G/5Gs

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1. Introduction

This part deals with the advanced use of the FPP 5G, i.e. the setting of the device according to the needs of the user. As previously indicated, this presupposes that the user is familiar with the techniques of plugging tests.

The FPP 5G settings are accessible from the main display (see following paragraph).

2. Screens of the main menu

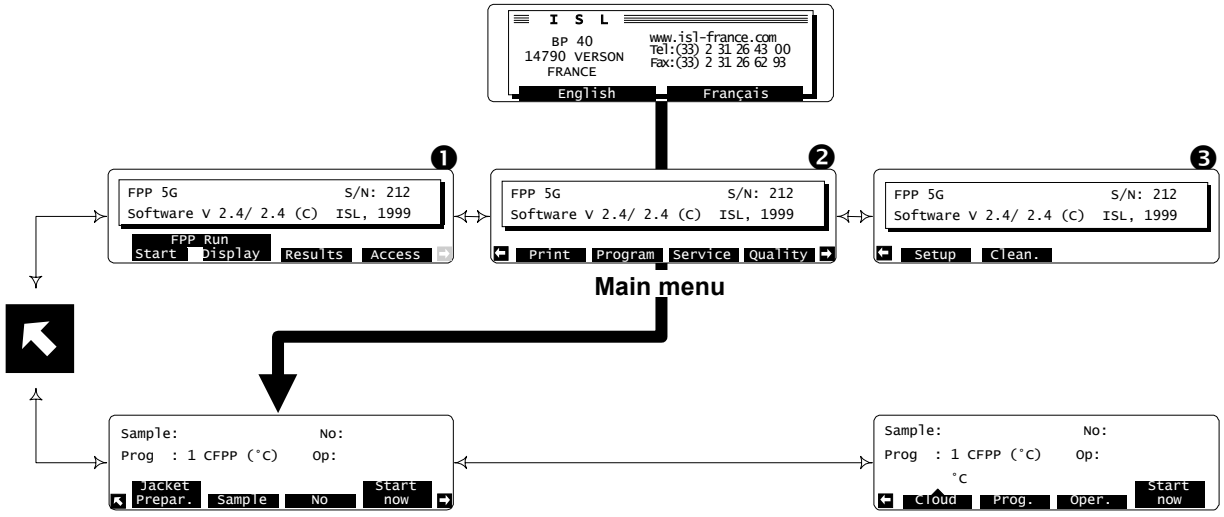


Diagram 2: Access to the main display level.

The main level display is the highest hierarchically speaking. It is not directly accessible when the device is switched on. To access it, after switching the device on and pressing on any button, it is necessary to go up one display level.

Diagram 2 above shows how access to this level operates.

➢If the user has operator access, a very simple menu is available to him (❶) :

↳The user can run and follow a test.

↳The user can display and print a result.

➢If the user has Laboratory (***Labo.***) or Maintenance (***Maint.***) access, the complete menu is available (❶+❷+❸)

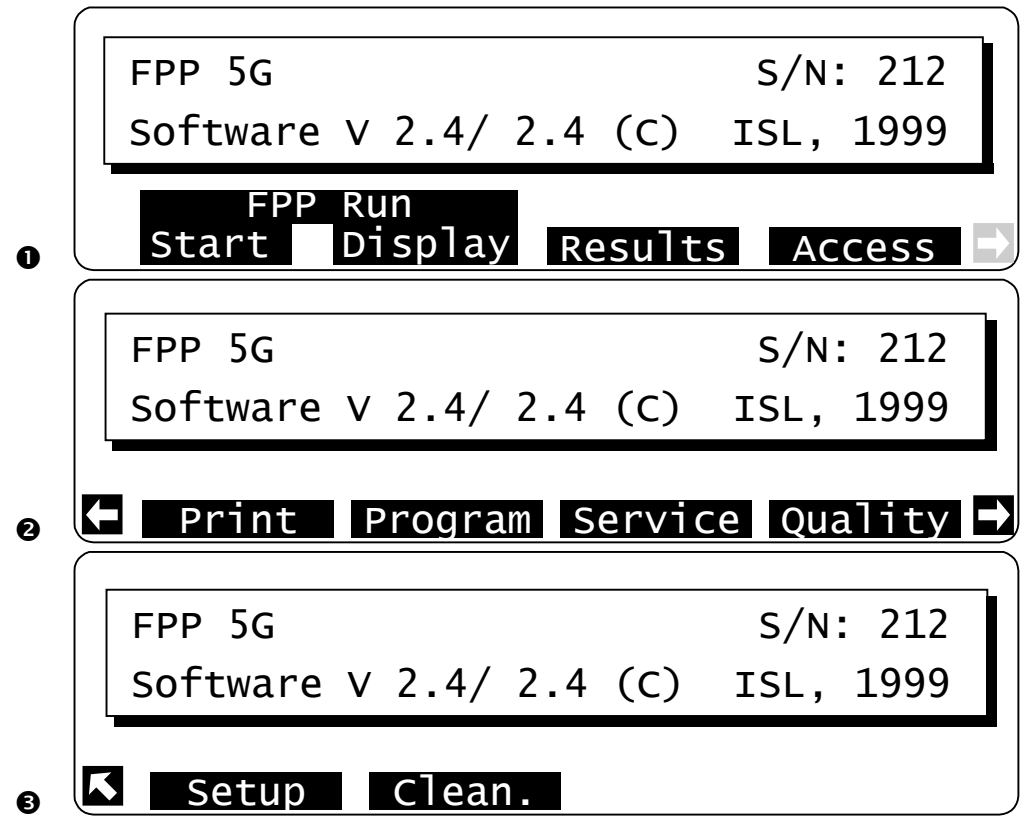


Figure 23: The three displays of the main level with access level 1 or more.

The main display level includes the following components, respectively from top to bottom and from left to right:

- The name of the analyzer.
- The serial number of the analyzer.
- The version of the control software / and dialog boxes.

The menus of the main level are : ***FPP Run/Start & FPP Run/Display, Results, Print, Program, Service, Quality, Setup, Access and Clean***. These menus will be dealt with in detail in the paragraphs following.

It should be noted, however, that the ***FPP Run (Start and Display)*** menu was covered almost in its entirety in Part 1.

In the following we shall assume that the access level is level 1 (Labo level). This level allows access to the settings associated with tests, making it possible to modify them and thus design personalized programs that respond to specific needs. The access levels will be dealt with through the ***Setup*** menu.

3. Displaying results: The "Results" menu

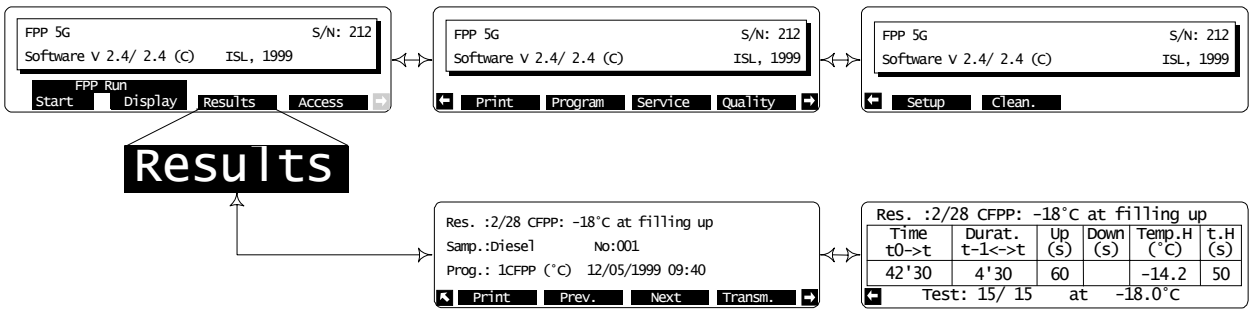


Diagram 3 : The Results menu

Test results are stored in a dedicated memory. The FPP 5G can store up to 50 test results (this depends on the number of suctions per test). When the memory is full, the FPP 5G automatically compresses the first results recorded. The results can be sent to a PC by the ALAN or the RS232C link (see § 9.7 : FPP 5G/s ⇔ PC communication: the "PC Link" and "RS232" on page 2-70).
To display the results the following procedure should be followed:

Procedure :

1. Press the button for the ***Results*** menu; this calls up the display allowing access to all the results saved, which are shown as follows:

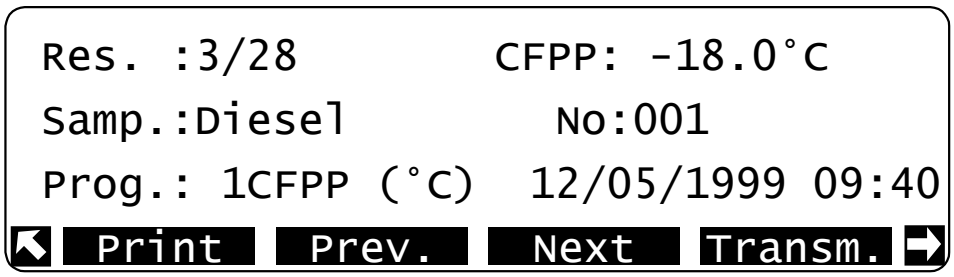


Figure 24: Ecran 1 du menu Results

- Res. : __/__: number of the result displayed over the number of results stored in memory
  * : An asterisk appears in front of the result number if the test has been carried out despite the date of the adjustment of the sample temperature measurement circuit was exceeded (refer to the section 7.2 page 2-58).
- CFPP : __: Limit temperature of sample filterability and the type of blockage (this information cannot be displayed – See Display/Print detection parameters, Table 3 program on page 44).
- Samp. : Identifying name of the sample
- No : Sample number
- Prog. : The program chosen for the test.
- Date and time of the end of the test.

2. To access the desired result, press as many times as necessary on the ***Prev***. and ***Next*** buttons.
3. Press the ***Print*** button to print out the result previously selected with the ***Prev***. and ***Next*** buttons.
4. Press the ***Transm***. button to validate a result so as to send it to the RS323C link or to the ALAN network.
5. When the desired result is achieved, details of the result may be viewed by pressing on the **NEXT DISPLAY** button, which gives the following display:

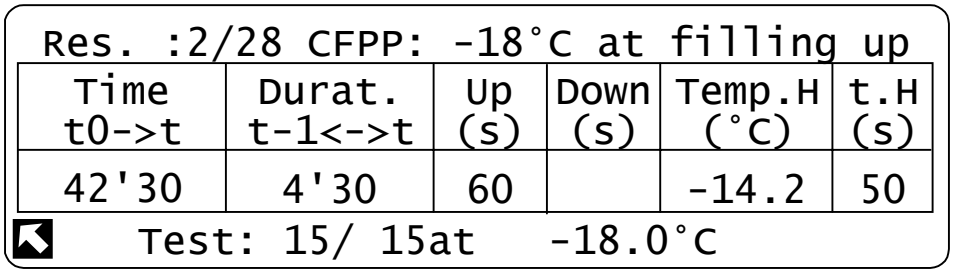


Figure 25: Display 2 of the Results menu

This screen, similar to the one in Figure 19 (on page 26), differs from it in the following respects:

- Upper part of screen, (above table)
  - Res. :__/__: sample ranking (e.g. result of test n°2 out of 28 carried out → Res. : 2/28)
  - CFPP : limit temperature of filterability of the sample
- Lower part of screen, (below table)
  - Test : __/__at __°C: Number of the suction displayed over the total number and the temperature at which they were carried out.

6. Press on the **UP** or **DOWN** keys on the front panel to display the details of each suction.

The duration of the rise, the descent, tH, can be visualized in seconds or in one-tenth seconds (see section 9 page 2-65 for the configuration).

4. Printing out: the " Print" menu

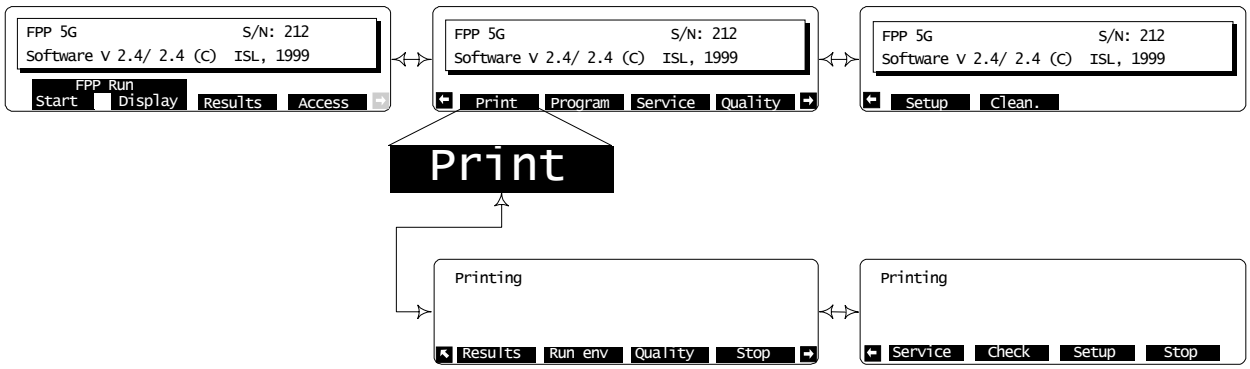


Diagram 4 : The Print menu

The FPP 5G/s can print out the following information : the results, the calibration ticket, or the parameters of a given program. To be able to do this, make sure that the device is linked up to a printer compatible with analyzer (using the PCL/3 or the ESC/P language) and configured “on line”. The printer is connected to the analyzer rear panel (see Figure 2 page 17).
To initiate printing, activate the main level ***Print*** menu; this display will appear:

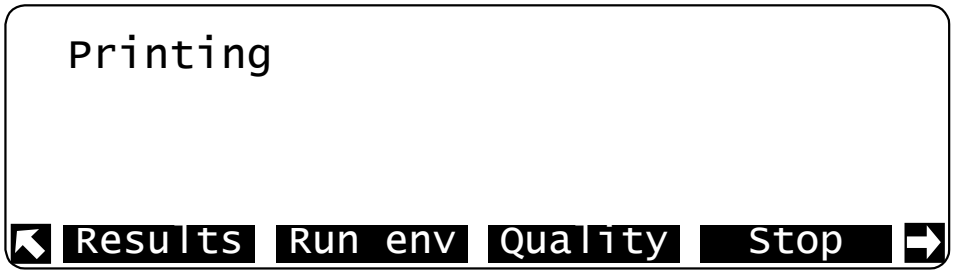


Figure 26: Print menu Display 1

The first screen of the ***Print*** has the following menus:

- The ***Results*** menu, to print out results.
- The ***Run env.*** menu, to print out a test or cleaning program.
- The ***Quality*** menu, to print out the calibration ticket.
- The ***Stop*** button, to stop printing in progress.

The second display of the menu ***Print*** menu appears thus:

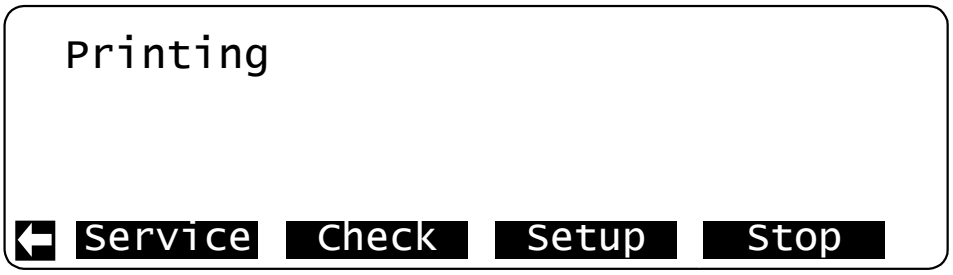


Figure 27: Print menu Display 2

Display 2 has the following menus:

- The ***Service*** menu, for printing out, among other things, the values of measurements in progress (sample temperature, jacket temperature and cryostat)
- The ***Check*** menu, to check the printer link.
- The ***Setup*** menu, to set the printer parameters.
- The ***Stop*** button, to stop printing in progress.

4.1. Printing out results

The FPP 5G/s can print, in different ways (with or without details, with or without program) and, as required, the results of the last test, of any test, or of all the previous tests (see Examples of printout types page Appendix A-79).
Results can be printed out at two levels:

1. From the ***Results*** menu by activating the ***Print*** menu. At this level, the desired result can be printed out by selecting it by means of the ***Next*** or ***Prev*** buttons.
2. From the ***Print*** menu (see Figure 23 on page 2-38). When the ***Results*** menu is activated, the following display appears :

*Figure 28: **Results** menu Display 1 (**Print** menu)*

From this display the following can be printed out :

- Any result. Activating the ***One res*** button calls up the display in Figure 24 on page 2-39. At this level the printout mode is that described in 1 of this paragraph. It should be noted that a printout of a result can be set. Thus in the printout result it is possible to include the test program used and/or details of the suctions. (See § 4.6: Printer configuration on page 2-44)
- All the results in the memory. In this latter case neither the programs used for the tests, nor details of the suctions, are printed out.

4.2. Printing test and cleaning program parameters

With the FPP 5G it is also possible to print the test and cleaning program parameters contained in the memory. Activating the ***Run env*** menu calls up the display below, allowing a choice between test programs and cleaning programs.

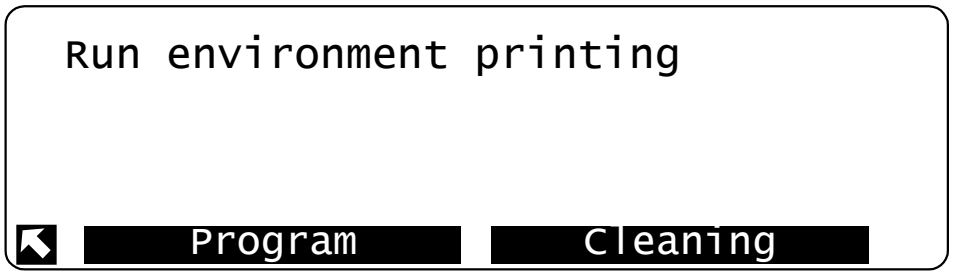


*Figure 29: **Run env** menu display(**Print** menu).*

Pressing one or other of the buttons gives access to a display that makes it possible to select the program to be printed out.

4.3. Printing out the calibration ticket

The calibration ticket can also be printed out (provided it is in access level 1 – see Appendix A section Appendix A - 4 -: 80 column calibration ticket printout – page Appendix A-84). Simply activate the ***Quality*** menu and from there call up the following display:

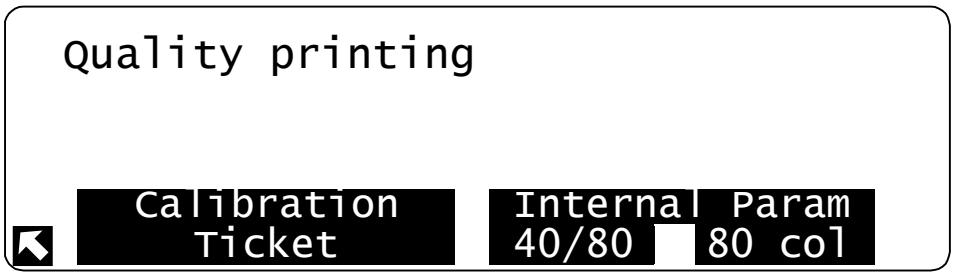


*Figure 30: **Quality** menu display (**Print** menu)*

The ***Internal param***. button gives a choice between :

- Taking into account the printer configuration (40/80 button).
- Always printing out in 80 columns (80 col button) – whatever the printer configuration.

4.4. Printing out measurements in progress

Print-out of Measures can be activated via the measures display screen or by using the ***Measures*** button in the following display:

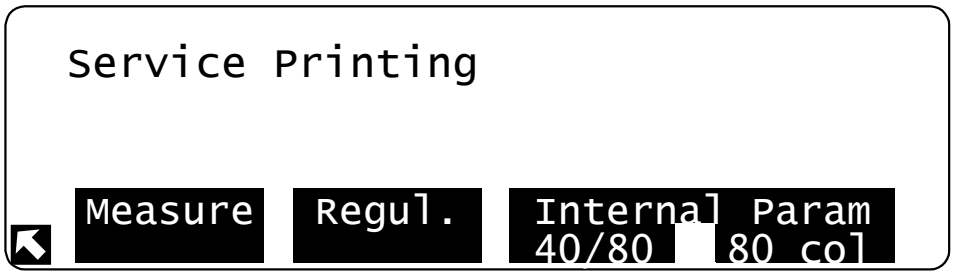


Figure 31: Service Printing.

The contents of the ***Regul***. menu are accessible only with level 2 access authorization. With this menu all the regulation data linked to the following functions can be collected and sent to a printer (see Appendix A section 6 -80 column test printout page A-84) or another peripheral (PC):

- Jacket probe.
- Vacuum pump.
- Optical detectors.

4.5. Printout test

The ***Check*** button (see Figure 27 page 2-41) allows a test to be printed out to check the printer ⇔ FPP 5G/s link (see Appendix A section 6 - 80 column test printout page Appendix A–84). Moreover, this makes it possible to check the printing quality of certain special characters (e.g. the degree symbol) which may not be printing properly because of incorrect adjustment.

4.6. Printer configuration

The printer is configured by means of the ***Setup*** button (see Figure 27 on page 2-41). Configuration can also be carried out by means of the ***Printer*** menu of the ***Setup*** menu.
The following displays can be called up by activating the ***Setup*** button (on the ***Print*** menu):

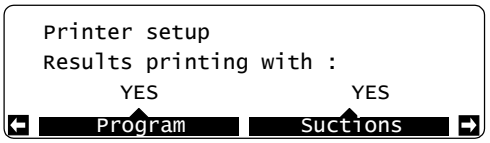
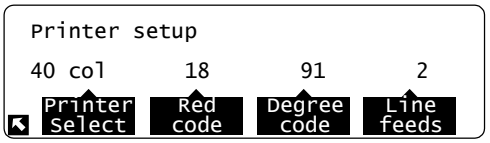
Display (***Print*** / ***Setup*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
	Printer setting ***Automatic result printing*** : Automatic printing of results at end of test (if a printer is connected to the device). ***Check*** : Printer test printout.	Yes/No
Setup menu display 1.		
		Next display
	Results printing with : ***Program*** : printing of program used for the test. ***Suctions*** : printing of data associated with suctions	Yes/No Yes/No
Setup menu display 2.		
		Next display
	***Printer Select*** : selection of a printer compatible with the analyzer (using ESC/P or PCL/3 language) ***Red code*** : code for printing in red ***Degree code*** : ASCII code designating "degree" code (see printer doc.). ***Line feeds*** : number of line feeds after printing.	40 or 80 columns See printer doc. See printer doc. 0 to 5 or form feed
Setup menu display 2.		
E.g. : Configuration of a 40 column CITIZEN® printer: 40 18 91 2 Configuration of an 80 column EPSON® printer: 80 248 2		
For the exact configuration, however, reference must be made to the manual supplied by the printer manufacturer.		

Table 1: **Print / Setup** *menu display*

5. Choosing a program and display for these parameters: the "Program" menu

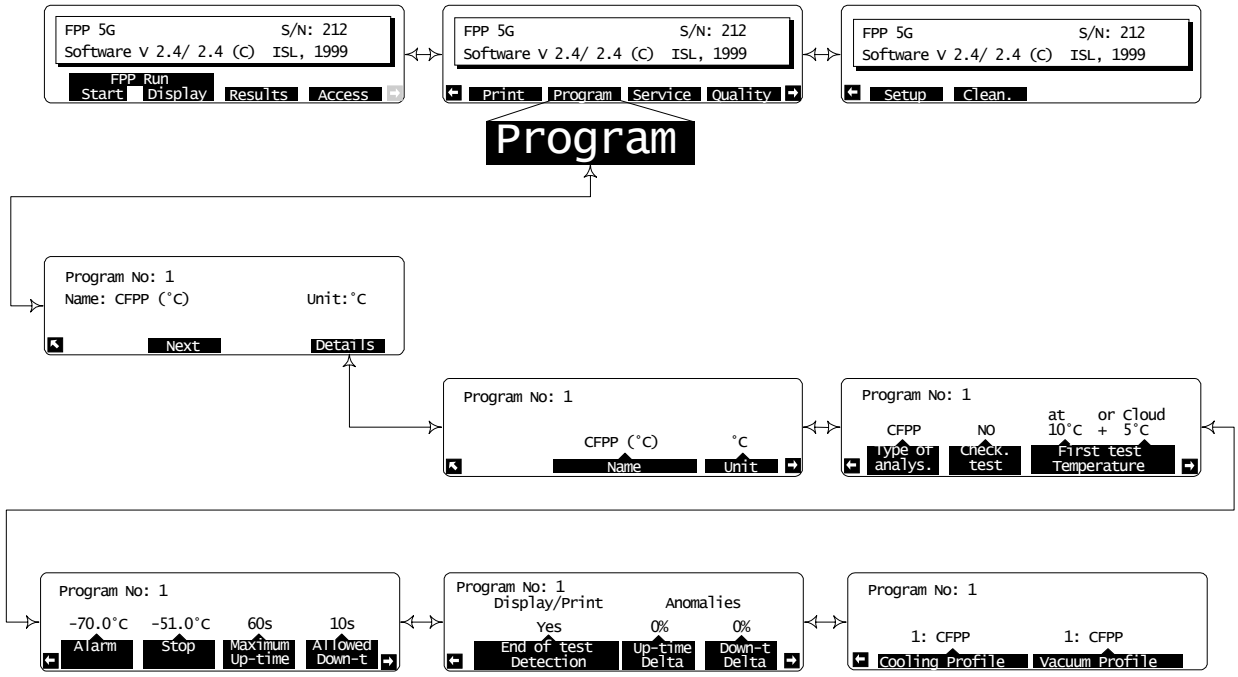


Diagram 5 : The Program menu

A test program is made up of the following elements :

- Test parameters.
- A cooling profile.
- A vacuum profile.

The FPP 5G/s has 5 factory pre-installed programs, viz.:

- CFPP (°C) : standard CFPP test – Temperature measurement unit °C
- Simul (°C) : filterability test with constant cooling rate of jacket - Temperature measurement unit °C
- CFPP (°F) : CFPP test - Temperature measurement unit °F
- Simul (°F) : filterability test with constant cooling rate of jacket - Temperature measurement unit °F
- CFPP (°C) : memory area with priority use for downloading programs from a PC.

The FPP 5G/s also has 5 cooling profiles and 2 vacuum profiles:

Program	Cooling profile	Vacuum profile
1. CFPP (°C)	1. CFPP (°C)	1. CFPP
2. Simul (°C)	2. Simul (°C)	2. Simul
3. CFPP (°F)	3. CFPP (°F)	1. CFPP
4. Simul (°F)	4. Simul (°F)	2. Simul
5. CFPP (°C)	5. CFPP (°C)	1. CFPP

Table 2: Summary table of programs and profiles.

The Table 2 (page 2-46) summarizes all the programs and profiles contained in the FPP 5G memory. This makes it possible to carry out a test in strict compliance with the current standard (e.g. line 1, table 2), but also all kinds of combinations, provided one has the necessary access authorizations.
All the parameters of a program are visible, but can only be modified if one has the level 1 access authorization (laboratory). To access the associated programs and profiles, proceed as follows:

Procedure:

1. Activate the ***Program*** menu of main level display 1 (see Diagram 5 : The Program menu on page2-45). The following display then appears:

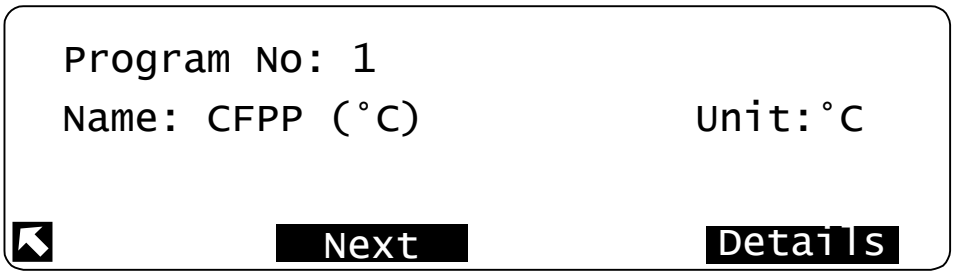
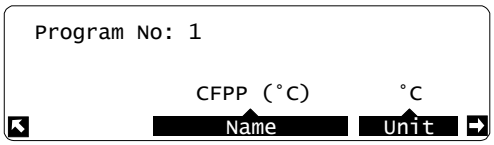
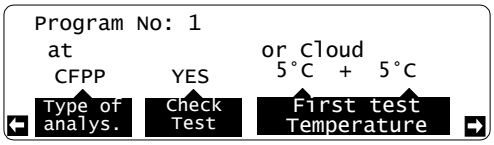
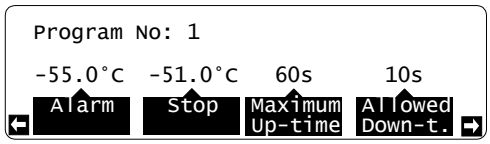


*Figure 32: Display 1 of level 2, **Program** menu.*

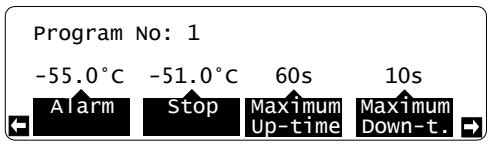
With the ***Next*** button the factory pre-installed programs can be scrolled and selected. In Figure 32, the program selected is number 1.

2. To display the program parameters, press on the ***Details*** button. These are the displays which appear:

Display (***Program*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Program*** menu display 2	Current program is N°1 (permanent display). ***Name*** : selection of program name. The program name in this case is CFPP ***Unit*** : selection of temperature measurement unit. The temperature is here measured in °C.	 String °C/°F
		Next display..
 ***Program*** menu display 3	***Type of test*** : choice of test type : CFPP : plugging temperature result search. **or** Simul : result searched is the operability temperature or temperature of the previous plugging test. ***Check Test :*** Carrying out or not a suction at the beginning of the test, so as to check the device status ***First test temperature*** : temperature θ of the first test. 1) If tmp of cloud point unknown → Enter θ 2) If tmp of cloud point known → θ = cloud + X	CFPP/Simul Yes/No 1) Fixed θ : Min -70°C Max +50°C 2) X Min 0°C Max +50°C
		Next display..



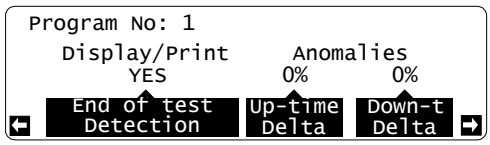
Program menu display 4 (CFPP)



Program menu display 4 (Simul)

Alarm : alarm at the moment a noteworthy temperature is reached.	Min -70°C Max +50°C
Stop : adjustment of the end of test sample temperature. The last test will be carried out here at -51°C	Min -51°C Max +50°C
Maximum up-time: adjustment of the maximum duration of suction before the test is stopped. 60s is the duration required by NF EN 116.	Min 1s Max 120s
If the test type is CFPP	Min 0s (*)
Allowed down-t : time allowed for the sample to go back down the testing tube. If the temp. of the next suction is achieved before this time has elapsed the test will not be stopped.	Max 120s
If the test type is Simul,	
Maximum Down-t : maximum time for the sample to go back down the tube before stopping the test.	Min 0s (*) Max 120s
(*) 0s : means that there is no detection on descent; the sample is considered to have gone down.	

Next display..



Program menu display 5

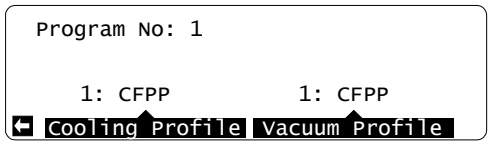
Detection Display/Print : type of detection displayed or not " -18°C At filling up " - see Figure 24 - page 2-39.	Yes/No
Anomalies: indicating the anomalies on the up and down times (printed with the result and indicated by a warning alarm at the end of test).	0 to 100% (0: no check)

The up and down times are compared each others: if delta T (time interval between each suction) decreases, a warning alarm is triggered at the end of test and a message will be printed with the result. The time reduction allowed is a percentage of the previous suction time: if the interval in % (time of the suction (N-1) – time of the suction N) ≥ to the interval programmed in %, an anomaly is detected at the suction N.

$$\text{Interval in \%} = \frac{(t_1 - t_2)}{t_1} \times 100$$

with t_1 : time of the suction N-1 ; t_2 : time of the suction N

Next display..



Program menu display 6

Cooling profile : choice of cooling profile (pre-heating option).	1 or 2
Vacuum profile : choice of vacuum profile. Detailed in Table4 and Table 5	1 or 2

*Table3: **Program** menu displays*

Without the necessary authorizations (passwords), it is not possible to change the field values of the Program menu displays. This requires authorization at Access 1 level.

The ***Cooling Profile*** and ***Vacuum Profile*** menus give access, in their turn, to another display level that allows the cooling and vacuum profiles to be seen or set. Each pre-installed program has its own vacuum and cooling profiles which can be set as desired. A cooling profile can be displayed following the procedure below; parameter setting (change of values) is subject to the necessary access authorization for level 1.

5.1. Cooling profile : the "Cooling profile" menu

A cooling profile is made up of several stages. Each stage is defined by the following elements:

- A type (not modifiable on the device).
- A Set point.
- A condition for passage to the next stage.

Only the stages that have already been programmed may be modified. To personalize the profiles, it is necessary to go the PC software.
After the ***Cooling Profile*** menu has been activated, the following display appears:

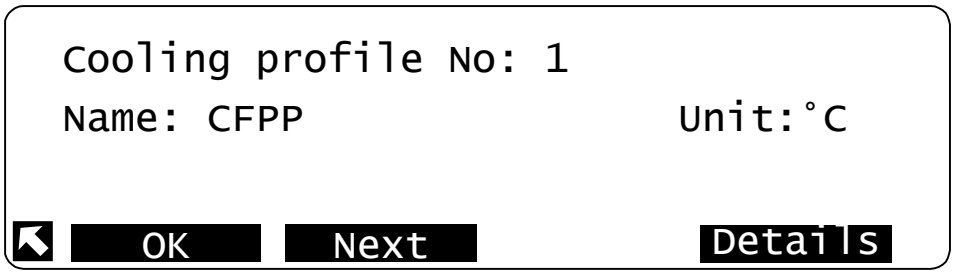
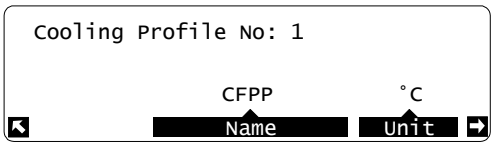
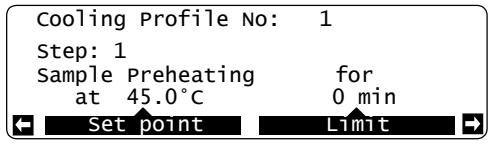
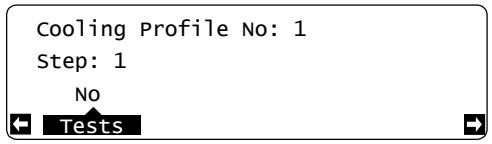
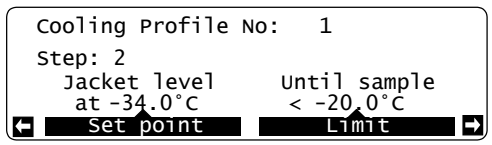


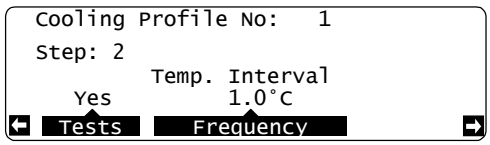
Figure 33 : Cooling profile menu Display 1

With this display, a cooling profile can be chosen from among the five pre-installed, by activating the ***Next*** button as often as necessary and validating with ***OK*** (having received the necessary authorization). On the following displays the parameters for each profile stage can be seen. Taking as examples two profiles:

1. **Cooling profile for the standard CFPP test.**
2. **Cooling profile for the Simul (°C) test**

Cooling profile N°1

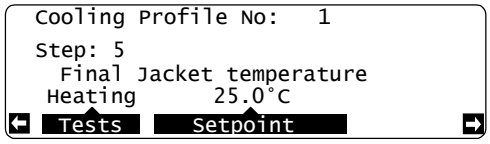
Displays (***Cooling Profile*** menu (No:1).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Cooling Profile*** menu Display 1 (No :1)	The cooling profile is number 1 (permanent field). ***Name*** : selection of profile name. ***Unit*** : selection of temperature measurement unit.	 String °C/°F
		Next display
 ***Cooling Profile*** menu Display 2 (No :1)	Step 1 Pre-heating of sample. ***Set point*** : Sample pre-heating temperature setting. ***Limit :*** duration of pre-heating expressed in minutes, once the setting has been reached. 0 min indicates that there is no pre-heating.	 Min +30°C Max+50°C Min 0 min Max 60 min
		Next display
 ***Cooling Profile*** menu Display 3 (No :1)	Step 1 ***Tests*** : there can be no suction during the pre-heating stage.	No
		Next display
 ***Cooling Profile*** menu Display 4 (No :1)	Step 2 First cooling stage in the CFPP test ***Set point*** : temperature setting of the jacket cooling **stage**. ***Limit*** : limit sample temperature for moving to next stage of jacket cooling.	
		Next display



Cooling Profile menu Display 5 (No :1)

Step 2
Tests : suction (or not) during the first jacket cooling stage. — Yes/No
Frequency : setting of interval between two suctions. Intervals are expressed either in minutes or in degrees °C/°F : — If ***Tests*** = Yes:
1) Interval in minutes. — Min 2 min, Max 60 min
2) Interval in °C/°F. — Min 1°C/2°F, Max 5°C/10°F

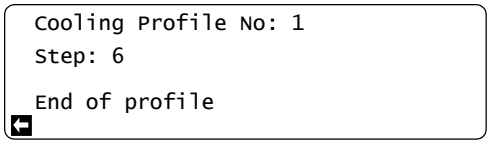
The above display is followed by four displays which correspond to the two jacket cooling stages described in standard NF EN 116 :



Cooling Profile menu Display 10 (No :5)

Step 5
Type : 1 - Final jacket re-heating. — Min 20°C/68°F
2 - Preparation of jacket for next test. — Max 30°C/86°F
Set point : Jacket temperature setting for final re-heating (if ***Type*** = 1) or preparation for a new test (if ***Type*** = 2).

Next display



Cooling Profile menu Display 11 (No :1)

Stage 6
End of profile display - common to all the profiles.

Table4: Cooling profile N°1.

Cooling profile N°2

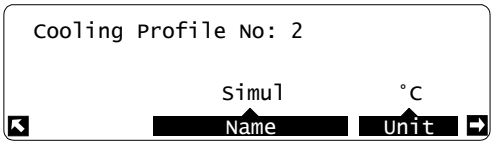
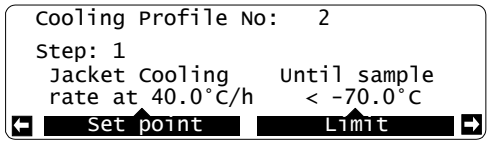
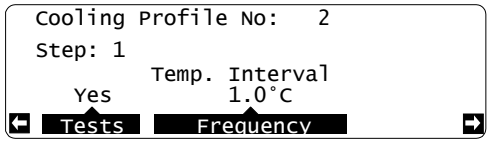
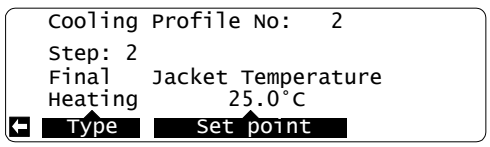
Displays (***Cooling Profile*** menu No:2).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Cooling Profile*** menu Display 1 (No :2)	Cooling profile 2 ***Name*** : selection of profile name. ***Unit*** : selection of temperature measurement unit.	
Next display		
 ***Cooling Profile*** menu Display 2 (No :2)	Stage 1 Sample cooling rate ***Set point*** : setting of jacket cooling **rate**. ***Limit*** : limit sample temperature for moving to next stage.	Min 0.5°C/h-1°F/h Max 60°C/h-108°F/h
Next display		
 ***Cooling Profile*** menu Display 5 (No :2)	Stage 2 ***Tests*** : suction ***Frequency*** : setting of interval between two suctions. Intervals are expressed either in minutes or in degrees °C/°F : 1) Interval in minutes. 2) Interval in °C/°F.	Yes/No If ***Tests*** = Yes: Min 2 min Max 60 min Min 1°C/2°F Max 5°C/10°F
Next display		
 ***Cooling Profile*** menu Display 5 (No :2)	Stage 3 See ***Cooling Profile*** menu Display 10 (No :1)	
End of profile.		

Table 5: Cooling profile N°2

5.2. Vacuum profile: the "Vacuum profile" menu

A vacuum profile is composed of segments. Each segment is defined by the following elements:

- A type (non modifiable).
- A setting.
- A condition for moving to the next stage (if necessary).

After the ***Vacuum Profile*** menu has been activated, the following display appears:

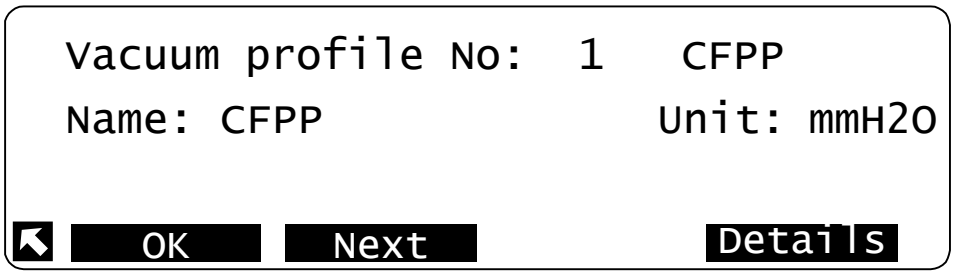


Figure 34 : Vacuum Profile menu Display 1

This display allows one of the two pre-installed vacuum profiles to be chosen, by activation of the ***Next*** button and validation with ***OK*** (the necessary authorization having been received). The following displays show the parameters for each stage of the profiles:

1. **Vacuum profile for the standardized CFPP test**
2. **Vacuum profile for the Simul (°C) test**

Vacuum profile N°1

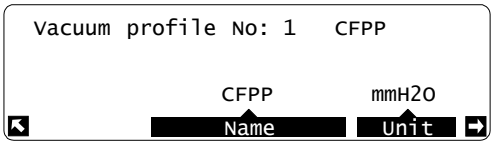
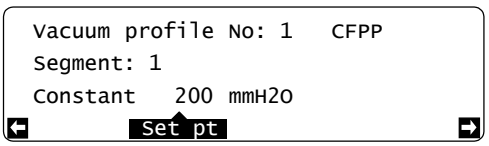
Displays (***Vacuum Profile*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Vacuum Profile*** *menu Display 1.*	Vacuum profile N°1 CFPP (perm. field) ***Name*** : profile name. ***Unit*** : unit of vacuum measurement.	Charac. {mmH2O KPa mbar
		Next display
 ***Vacuum Profile*** *menu Display 2.*	Segment 1 **Constant Vacuum** ***Set pt*** : setting of vacuum value.	(150→250) mmH_2O (1.5→2.5) Kpa (15.0→25.0) mbar
	End of profile	

Table 6: Vacuum profile displays N°1

Vacuum profile N°2

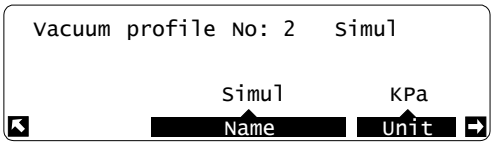
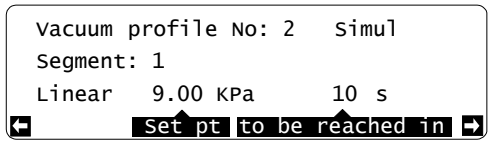
Displays (***Vacuum Profile*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
	Vacuum profile N°2 Simul (perm. field) ***Name*** : name of profile. ***Unit*** : unit of vacuum measurement.	String ⎧mmH2O ⎨Kpa ⎩mbar
Vacuum Profile *menu Display 1.*		
		Next display
	Segment 1 **Linear** variation vacuum ***Set pt*** : First vacuum limit value. ***to be reached in*** : time, in seconds, before moving to second vacuum limit value.	(0 → 1600) mmH2O (0 → 16)Kpa (0 → 160)mbar (1 → 180)s
Vacuum Profile *menu Display 2.*		
The display above is followed by two displays corresponding to segment 2 and segment 3 of the vacuum profile: 1. 13,50 KPa to be attained in 26s 2. 15,50 KPa to be attained in 60s		
	End of profile	

Table7: Vacuum profile displays N°2

6. Measurement and diagnostics: the "Service" menu

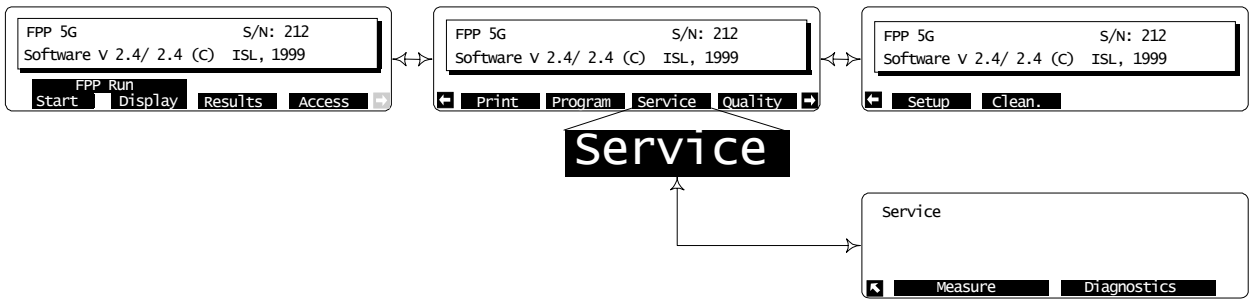


Diagram 6 : The Service menu.

The ***Service*** menu is in great part dedicated to maintenance. With this menu it is possible to:

- Display measures.
- Slave the main parts of the device.

Activating the ***Service*** menu calls up the following display:

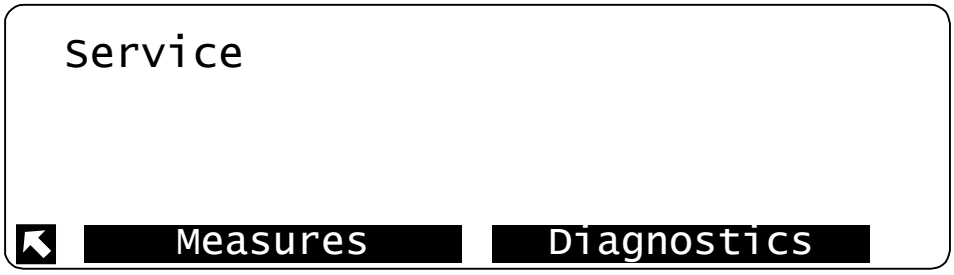


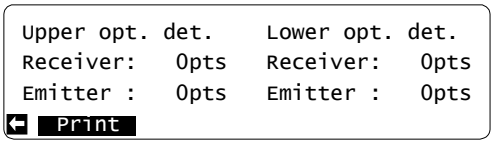
*Figure 35: **Service** menu displays.*

The ***Measurements*** and ***Diagnostics*** menus lead to a series of screens. The series of screens for the FPP 5G differs from those for the FPP 5Gs. In fact, on the FPP 5Gs the menus allow a built-in cooling compressor diagnostic to be made if necessary.

6.1. Measurement and diagnostic on the FPP 5G analyzer

The ***Measures*** menu (in the ***Service*** menu) gives access to the following information, organized into three displays:

Displays (***Measures*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
Samp.: 30.4°C 111.85Ω A/D:DEDE Jack.: 29.2°C 111.38Ω A/D:BE17 Refr.: 31 °C Cool.: 0.0% Heat.: Print	Samp. : sample temperature (°C). resistance of sample probe.(Ω). Jack. : jacket temperature (°C) resistance of jacket probe. (Ω). A/D : analog/digital conversion. Refr. : cooling circuit entry temperature. Cool. : percentage cooling. Heat : percentage heating. ***Print*** : printing of three displays.	
Measures menu Display 1. Sample, jacket, and refrigerant temperatures taken.		Next display
Pressure: 1 mmH2O A/D: F97 Pump : 0 mmH2O D/A: 0 Print	Pressure : measured depression value. A/D : analog/digital conversion. Pump : vacuum value imposed on pump. D/A : digital/analog conversion. ***Print*** : printing of three displays.	
Measures menu Display 2. Pressure measured and pump command noted.		Next display



Measures menu Display 3.
Optical sensors reading noted.

Upper optical detector.
Receiver : number of points received.
Emitter : number of points emitted.
Lower optical detector.
Receiver : number of points received.
Emitter : number of points emitted.

Table8: ***Measures*** *menu displays.*

The ***Diagnostics*** menu can be accessed with the level 2 access authorization (maintenance).

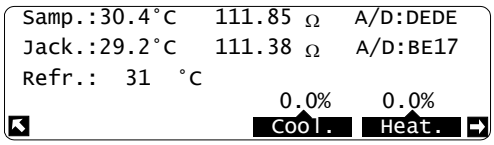
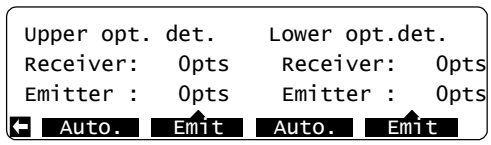
Displays (***Diagnostics*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Diagnostics*** menu Display 1.	For upper part of display, see Table8. ***Cool***. : percentage of cooling entry. ***Heat***.: percentage of heating entry.	
		Next display
 ***Diagnostics*** menu Display 2	For upper part of display, see Table8. ***Diag***. : vacuum setting. ***Pump*** : manual pump start. ***Suct.SV*** : open/shut suction solenoid valve ***AirSV*** : open/shut leak solenoid valve.	200 / 1600 mmH2O (2 / 16) Kpa (20 / 160) mbar ON/OFF ON/OFF ON/OFF
☞ ***Diag***. = 200 mmH2O ; ***Pump*** = ON → ***Suct.SV*** = ON/OFF → ***AirSV*** = OFF	***Diag***. = 1600 mmH2O ; ***Pump*** = ON → ***Suct.SV*** = ON or OFF (set before pump start) → ***AirSV*** = ON	
		Next display
 ***Diagnostics*** menu Display 3	Optical detector Emitter : number of points emitted. 0 pts : no light emitted. 4095 pts : maximum light emitted Receiver : number of points received : 0 pts : no light received. 4095 pts : maximum light received. ***Auto***. : automatic control of emitter to obtain a given no. of points on the receiver (≈2000 pts). ***Emit*** : manual entry of number of points to be emitted.	0 → 4095 pts (max. emission) 0 → 4095 pts

Table 9: ***Diagnostics*** *menu displays.*

6.2. Measurement and diagnostic on the FPP 5Gs analyzer

The ***Measures*** menu (in the ***Service*** menu) gives access to the following information, organized into three displays:

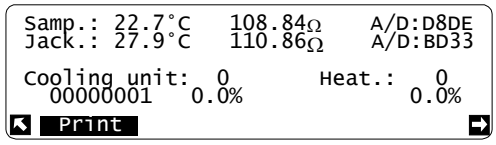
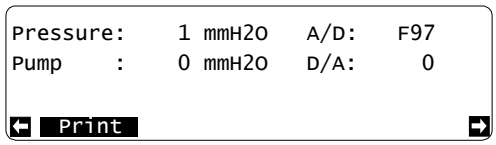
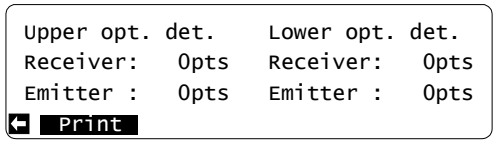
Displays (***Measures*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).
 ***Measures*** menu Display 1. Sample, jacket, and refrigerant temperatures taken.	Samp. : sample temperature (°C). resistance of sample probe.(Ω). Jack. : jacket temperature (°C) resistance of jacket probe. (Ω). A/D : analog/digital conversion. Cooling unit: - Effective number of applied points. Information given back by the cooling compressor command board. D0 : reserved for ISL use D1 : reserved for ISL use D2 : reserved for ISL use D3 : ventilation 1 = ON / 0 = OFF D4 : temperature alarm D5 : optical stroke D6 : maximum current D7 : optical stroke fault - Request in percentage sent to the cooling compressor control board. Heat. : - Effective number of applied points. Information given back by the cooling compressor command board. - Request in percentage sent to the cooling compressor control board. ***Print*** : printing of three displays.
	Next display
 ***Measures*** menu Display 2. Pressure measured and pump command noted.	Pressure : measured depression value. A/D : analog/digital conversion. Pump : vacuum value imposed on pump. D/A : digital/analog conversion. ***Print*** : printing of three displays.
	Next display
 ***Measures*** menu Display 3. Optical sensors reading noted.	Upper optical detector. Receiver : number of points received. Emitter : number of points emitted. Lower optical detector. Receiver : number of points received. Emitter : number of points emitted.

*Table 10: **Measures** menu displays.*

The ***Diagnostics*** menu can be accessed with the level 2 access authorization (maintenance).

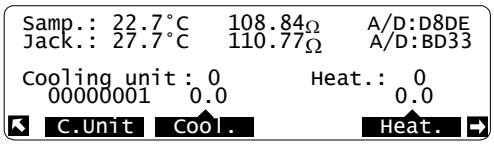
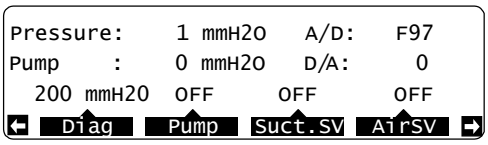
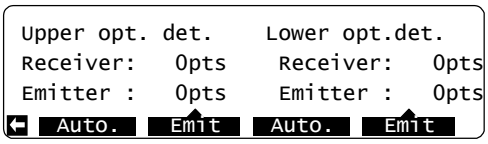
Displays (***Diagnostics*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
	For upper part of display, see Table 10. ***C. Unit***: enables to start cooling unit diagnostic. ***Cool***. : enables entering a percentage of cooling ***Heat***.: enables entering a percentage of heating.	
Diagnostics menu Display 1.		
		Next display
	For upper part of display, see Table 10. ***Diag***. : vacuum setting ***Pump*** : manual pump start. ***Suct.SV*** : open/shut suction solenoid valve ***AirSV*** : open/shut leak solenoid valve.	200 / 1600 mmH2O (2 / 16) Kpa (20 / 160) mbar ON/OFF ON/OFF ON/OFF
Diagnostics menu Display 2.		
☞ ***Diag***. = 200 mmH2O ; ***Pump*** = ON ➔ ***Suct.SV*** = ON/OFF ➔ ***AirSV*** = OFF	***Diag***. = 1600 mmH2O ; ***Pump*** = ON ➔ ***Suct.SV*** = ON or OFF (set before pump start) ➔ ***AirSV*** = ON	
		Next display
	Optical detector. Emitter : number of points emitted. 0 pts : no light emitted. 4095 pts : maximum light emitted Receiver : number of points received : 0 pts : no light received. 4095 pts : maximum light received. ***Auto***. : automatic control of emitter to obtain a given no. of points on the receiver (≈2000 pts). ***Emit*** : manual entry of number of points to be emitted.	0 → 4095 pts (max. emission) 0 → 4095 pts
Diagnostics menu Display 3.		

Table11: ***Diagnostics*** *menu displays.*

Activating the ***C. Unit*** menu (first screen of the ***Diagnostic*** menu) gives the possibility of running the diagnostic procedure for a built-in cooling compressor.

☞ ***Before running diagnostics remove pipette, tube and basket and place the cover on the jacket . The diagnostic procedures may run for up to 80 minutes.***

Diagnostics has three phases:

1. Initialization: heating to 40°C and regulation for 3 min.
2. Cooling: cooling to –110°C. During this phase the values of temperatures to be noted are taken (time required to fall to each notable temperature and effective number of points at this same temperature).
3. Reheating: return to ambient temperature.

The ***Print*** button allows a print-out to be made of the cooling compressor parameters (plus the values noted during phase two – see above) which can, if necessary, be sent to ISL's Customer Service for the compressor's condition to be checked.

The following table explains the cooling unit diagnostic procedure to follow:

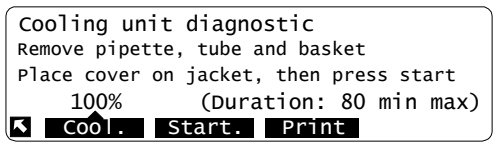
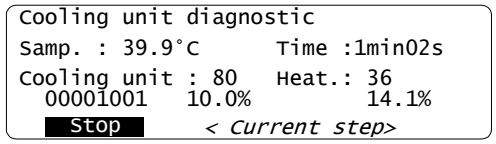
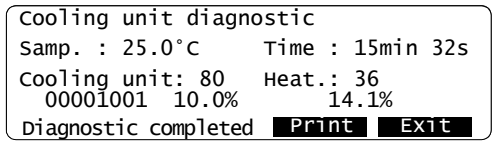
Displays (***C. Unit*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).
 ***C. Unit*** menu Display 1.	***Cool.***: button for entering percentage cooling required (100% by default) ***Start***: menu for running the diagnostic procedure. ***Print*** : printing cooling compressor parameters stored during the last diagnostic.
	Next display
 ***C. Unit*** menu Display 2.	Samp.: sampling temperature Time: elapsed time. Three-minute countdown during the initialization phase, then diagnostic phase countdown. Cooling unit: - Effective number of applied points. Information given back by the compressor control board. - D7 to D0 see Table 10. - Request in percentage sent to the compressor control board. Heat.: - Effective number of applied points. Information given back by the compressor control board. - Request in percentage sent to the compressor control board. ***Stop***: stop the diagnostic procedure and return to the first display of the ***C. Unit*** menu. <*Current step*> : one of the three following steps: - Initialization, - Cooling, - Reheating.
	Next display
 ***C. Unit*** menu Display 3.	Upper part similar to previous display. ***Print*** : cooling compressor parameters. ***Exit***: back to first displays of the ***C. Unit*** menu.

Table12: ***C. Unit*** *menu displays.*

7. Adjustment and calibration: the "Quality" menu

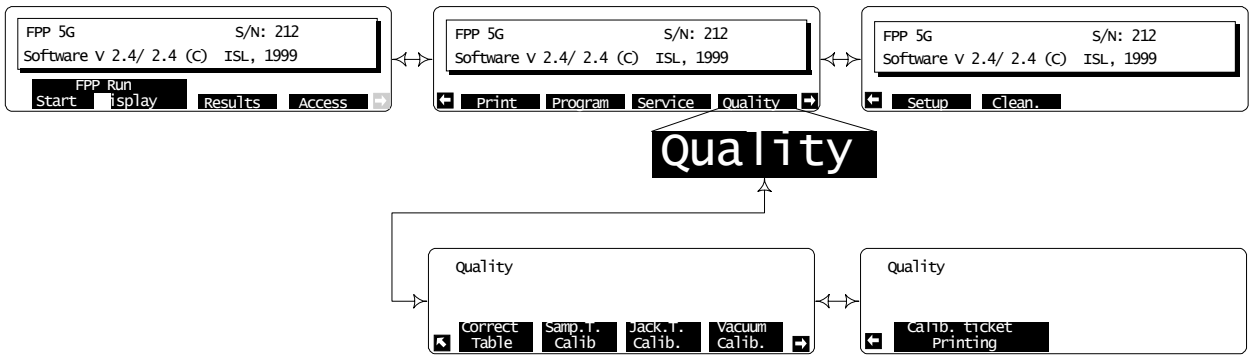


Diagram 7 : The Quality menu

The FPP 5G measurement instrumentation sometimes requires calibration. How often depends on the user, but it is recommended that all the measurement instruments be adjusted at least once a year. The ***Quality*** menu has a series of menus dealing with the following adjustments; these are grouped in the display below:

Figure 36: Quality menu display 1

- The "***Correct Table***" menu: sample temperature measurement correction table.
- The "***Samp. T. Calib***" menu: calibration of sample temperature measurement. .
- The "***Jack. T Calib***" menu: calibration of jacket temperature measurement. .
- The "***Vaccum Calib***" menu: vacuum circuit calibration.

Adjustments carried out in this way can be printed out using the ***Calib. ticket Printing*** : menu

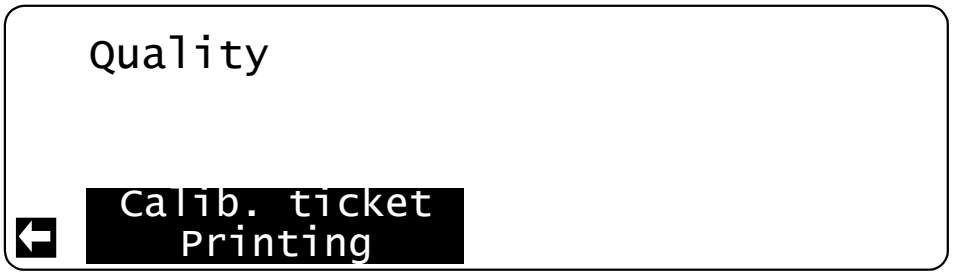


Figure 37: Quality menu display 2

7.1. Sample probe correction table: the "Correct Table" menu

The ***Correct Table*** menu makes it possible to enter a correction table for the sample temperature measurement probe. The sample temperature displayed takes this table into account (at rest, during testing and during calibration).

☞ ***The sample probe is a Pt100 platinum probe compliant with standard IEC 51 - Class A. It is supplied with an ISL Quality Certificate stating the value of the temperature discrepancy at 40°C (discrepancy = (Value – reference t°)°C).***

On activating the ***Correct Table*** menu the following display appears:

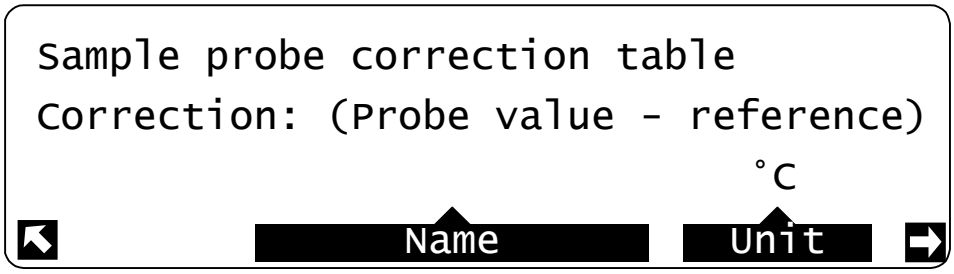


Figure 38: Correct Table menu Display 1

This display allows the name of the correction table to be entered and the table's unit of temperature to be selected. On a series of displays similar to the display below the correction values can be entered (correction value = value indicated by the probe – reference value), for temperatures from -100°C (-148°F) to +90°C(194°F) (with an increment of 10°C) :

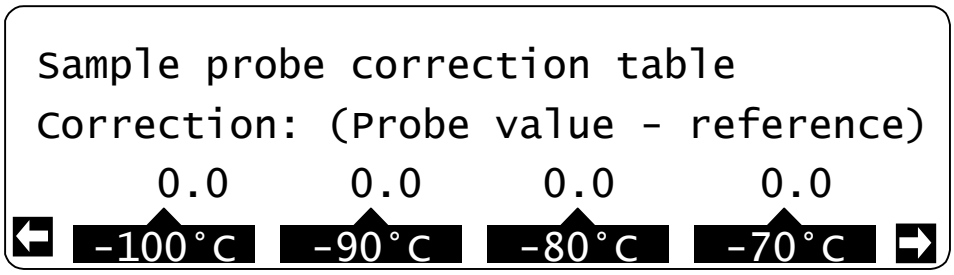


Figure 39: **Correct Table** *menu Display 2(/ 5)***:** correction value entry display.

7.2. Calibration of sample temperature measurement : the "Samp. T. Calib." menu

Calibration of the sample temperature measurement is done through the ***Samp.T. Calib***. menu. The sample temperature measurement must be calibrated using the following procedure:

Procedure :

1. Remove the DIN plug fom the probe.
2. Insert, into the free probe socket, the probe simulator socket (see spare parts list).
3. Activate the ***Samp. T. Calib.*** menu
4. Follow the indications on the displays set out below:

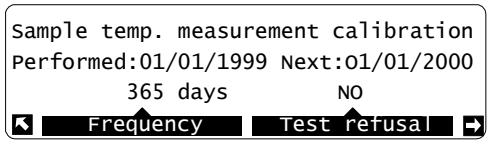
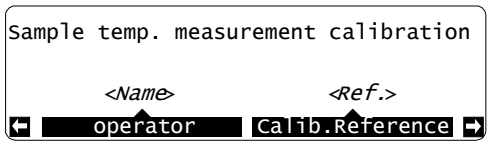
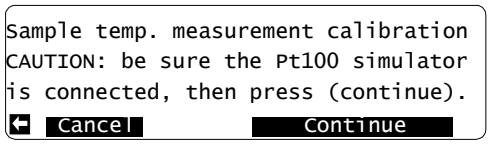
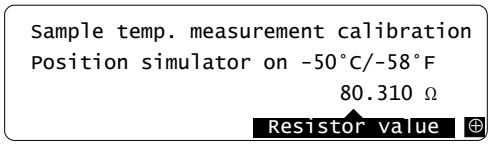
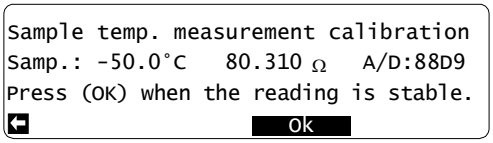
Displays (***Samp. T. Calib***. menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Samp. T. Calib***. menu Display 1	***Frequency*** : frequency of calibration. 0 days indicates that there is no check for the passing of the calibration date ***Test refusal*** : initiation of test denied when date set for calibration passed.	0 → 365 days Yes/No
		Next display
 ***Samp. T. Calib***. menu Display 2	***Operator*** : name of calibration operator. ***Calib. Reference*** : calibration reference.	String String
		Next display
 ***Samp. T. Calib***. menu Display 3	***Cancel*** : cancel calibration; Return to display 1 of ***« Samp. T. Calib »*** menu. ***Continue*** : once calibration has been initiated it is no longer possible to cancel it . The keys on the front panel are disabled.	
		Next display
 ***Samp. T. Calib***. menu Display 4	Position the simulator knob at -50°C/-58°F. ***Resistor value*** : enter, if necessary, the resistance value (Ohm).	
		Next display
 ***Samp. T. Calib***. menu Display 5	When the display becomes almost stable (with the first thre characters of the A/D conversion stable) validate with***OK***.	
Proceed similarly with the simulator knob set on +50°C/122°F. At the end of operation display1 of the ***Quality*** is displayed.		

Table13: **Samp. T. Calib***. menu displays*

7.3. *Calibration of jacket temperature measurement: the "Jack. T Calib." menu*

Jacket temperature measurement calibration should preferably be carried out after calibration of the sample probe (see preceding paragraph). Calibration of the jacket temperature measurement can be carried out in one of two ways:

1. Automatically, by means of the sample probe.
2. Manually, by means of a calibrated thermometer.

The FPP 5G/s calculates the difference between the temperature indicated by the sample probe and the jacket temperature. If this is too big, it will consider that the calibration is being done by means of the external calibrated thermometer. In this case it will wait for a reference value to be entered before moving from one stage to the next.

Procedure :

1. Follow the indications on the displays set out in the following table:

Displays (***Jack. T. Calib.*** menu).	**Meaning of different menus** (From left to right and from top to bottom).
Jacket temp. measurement calibration <Name> <Ref.> Operator Calib.Reference ***Jack. T. Calib***. menu Display 1	***Operator*** : name of the operator for the jacket temperature probe calibration. ***Calib. Reference*** : calibration reference.
Next display	
Jacket temp. measurement calibration Fill the jacket up to the mark and immerse the reference probe. Setpt:10/-34°C Continue ***Jack. T. Calib***. menu Display 2	Fill the jacket up to the mark visible on the internal wall of the jacket, with the same liquid as that used in the cooling circuit. Selection of two setting temperatures ***Setpt: 10/-34°C*** or ***Setpt: -34/51°C*** : cooling stages. ***Continue*** : continuance of operation.
Next display	
Jacket temp. measurement calibration Set point : 10.0°C Waiting :6 min Jacket : 29.8°C Sample :29.0°C Cancel ***Jack. T. Calib***. menu Display 3	Set point : selection of the two calibration points. Waiting : waiting time for cooling of jacket Jacket : jacket temperature. Sample : sample temperature. ***Cancel*** : ending of calibration procedure (the only way of stopping the operation).
Next display	
Jacket temp. measurement calibration Jacket : 10.0°C Sample :10.0°C Waiting : 10 min °C Cancel Reference ***Jack. T. Calib***. menu Display 4	Jacket : jacket temperature. Sample : sample temperature. Waiting : waiting time for stabilization of sample temperature. During this time the operator can enter the reference value (reference field). If the sample probe is used, the FPP 5G/s will automatically take the value of the sample temperature shown on the screen. ***Cancel*** : stopping of calibration. ***Reference*** : sample temperature : -read on the thermometer. -or measured by the probe.
Do the same for the second stage (-34.0°C).	
End of jacket temperature calibration. wait until the jacket is reheated before draining it. Jacket: 15°C OK ***Jack. T. Calib***. menu Display 5	At the end of the operation the FPP 5G/s reheats the jacket to +25°C so as to allow emptying.

Table14: **Jack. T. Calib***.menu displays*

*7.4. Calibration of vacuum circuit: the "*Vacuum Calib.*" menu*

Vacuum pump calibration can be carried out at two vacuum levels : 200 mmH2Oand 1600 mmH2O.
For this calibration a manometer able to measure 250 mmH20 for the first level and 2000mmH20 for the second is needed.

Note: Only the vacuum level of the pump can be calibrated. The air flow rate in the pump is enslaved according to the vacuum.
The vacuum profile is managed by the system.

Procedure :

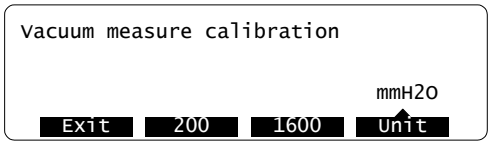
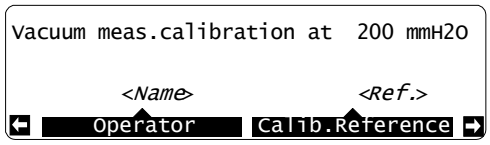
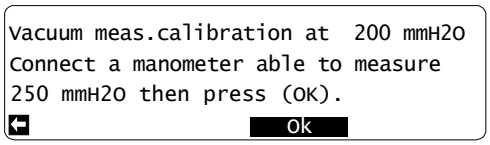
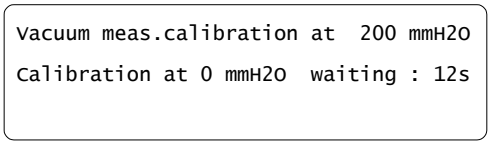
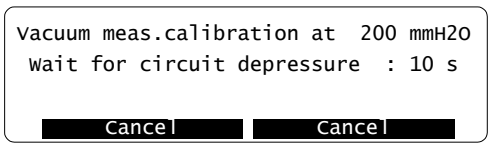
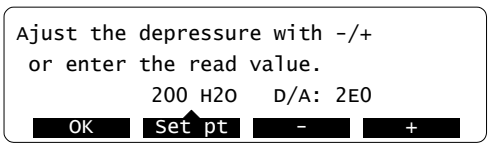
Displays (***Vacuum Calib.*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Vacuum Calib***. menu Display 1	Vacuum calibration ***Exit*** : operation cancel. ***200 mmH2O*** ***1600 mmH2O*** ***Unit*** :	⎧KPa ⎨mmH2O ⎩mbar
		Next display
 ***Vacuum Calib***. menu Display 2	Vacuum calibration at 200 mmH2O ***Operator*** : operator name ***Calib Reference*** : calibration reference.	String String
		Next display
 ***Vacuum Calib***. menu Display 3	At the end of the vacuum tube attach a manometer able to measure 2.50 KPa. Validate by activating the ***OK*** button	
		Next display
 ***Vacuum Calib***. menu Display 4	Presetup at 0 KPa : resetting of A/D converter waiting : time necessary for resetting.	
		Next display
 ***Vacuum Calib***. menu Display 5	Wait for circuit depressure : time necessary to attain vacuum level desired (2.00 or 16.00)KPa. ***Cancel :*** stops calibration.	10s →200mmH2O 30s →1600mmH2O
		Next display
 ***Vacuum Calib***. menu Display 6	***OK*** : validates calibration. ***Set pt*** : entry of value read on manometer. ***-/+*** : adjustment of vacuum as read on reference manometer.	

*Table 15: **Vacuum Calib**. menu displays*

7.5. Jacket temperature checking procedure

To access to the jacket temperature checking procedure, press the "***Jack T. check***" button of the ***Quality*** menu (see second screen, Diagram 7 page 2-57).

Procédure:

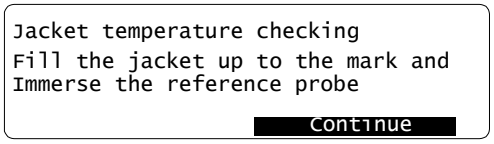
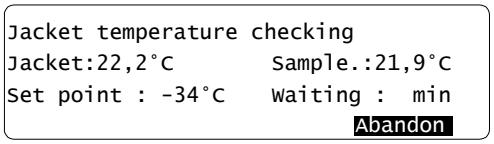
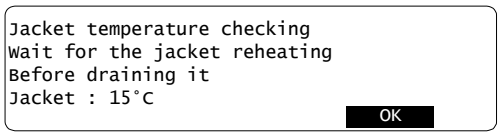
Displays (***Jacket temperature checking*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).
 ***Jacket Temperature checking*** Display 1	Jacket temperature checking: permanent field ***Continue*** : fill the jacket with methanol, position the probe inside then press the ***Continue*** key to go on.
	Next screen
 ***Jacket Temperature checking*** Display 2	Jacket temperature checking: permanent field ***Jacket Set point :*** enter a set-point temperature for the jacket. Press the ***Enter*** key on the keyboard to validate. ***Start :*** Start the jacket temperature checking procedure
	Next screen
 ***Jacket Temperature checking*** Display 3	Jacket temperature checking: permanent field ***Jacket :*** jacket temperature measured by the analyzer ***Sample:*** sample temperature measured by the sample temperature probe ***Set point :*** jacket set point temperature ***Waiting :*** near the set point temperature (0,25°C or 0,45°F), a countdown is activated before the temperature is stable
15 mn after the set point temperature is reached, the analyzer displays the jacket temperature and the temperature read by the sample temperature probe. These ones must be similar. Perform a jacket temperature calibration if necessary (see section Part 01.1 of this part, page 2-60).	
	Next screen
 ***Jacket Temperature checking*** Display 4	Jacket temperature checking: permanent field At the end of the checking procedure the FPP 5G/s reheats the jacket up to +25°C to allow to drain the jacket ***OK*** : validate the procedure and return to the Quality menu

*Table 16: **Jacket temperature checking** menu displays*

8. Alarm treatment

8.1. Types of alarm

8.1.1. Failure alarms

The failure alarms warn the operator in the event of a malfunction.
Failure alarm detection has at least one of the following consequences:

- A test cannot be started,
- A test in progress is stopped,

These failures set off a continuous audio alarm and the red LED of the **ALARM STOP** key lights up on the keypad (see the section 6.1.3 page 21). Press the **ALARM STOP** key to display the alarm message and acknowledge it or not. The red LED stays on for as long as the failure persists, even if the alarm has been acknowledged.
The failure alarms and the corresponding message are shown in the section 9.4.2 page 2-67.
The limits of certain of these failure alarms can be set (refer to the section 9.3 - Configuring alarms: the "Alarm" menu page 2-66).

8.1.2. Warning alarms

The warning alarms warn the operator of an expected event: " End of test with CFPP " for example.
They are accompanied as for them by a discontinuous audio alarm (the signal modulation width is adjustable; refer to the section 9.3 - Configuring alarms: the "Alarm" menu page 2-66). The red LED on the **ALARM STOP** key lights up on the keypad. It goes off when the alarm is acknowledged.
The warning alarms and the corresponding message are shown in the section 9.4.3 page 2-69.

8.2. Displaying alarms, stopping the buzzer

When an alarm is triggered, press the **ALARM STOP** key to display the cause. The following screen is displayed:

Figure 40: Alarms displaying screen

The alarms screen display contains the following **menus** and **buttons**:

- ***Exit***: to go back to the previous screen without acquitting the alarm.
- ***Acquit***.: to acquit the alarm and to go back to the previous screen.
  Press the ***Acquit*** key to stop the buzzer and return to the previous screen. Note that the red LED on the **ALARM STOP** key stays on for as long as the default persists, even if the alarm has been acknowledged.
- ***Review***: to display the alarm historical.

8.3. Alarm processing

Certain alarm cases present a danger. This is why most default settings switch the Analyzer into idle status, thus the cooling unit is cut out and the heating is stopped.
However, this is not to say that this type of analyzer is hazard-free or that if the Analyzer fails to go into idle status the operator and/or Analyzer are not in danger. It is important always to check what is going on whenever an alarm is triggered.

Attention! Generally when the alarm buzzer is triggered, the operator must display the cause and ensure that everything is working correctly.

For example, owing to a faulty component an alarm that normally should place the analyzer in idle mode fails to do so. In that case, the operator must intervene by switching off the Analyzer.

8.4. Alarms historical

The FPP 5G/s can register up to 16 alarm messages.

Activate the ***Review*** menu from the alarm displaying screen (see Figure 40 page 2-63), the following screens appear:

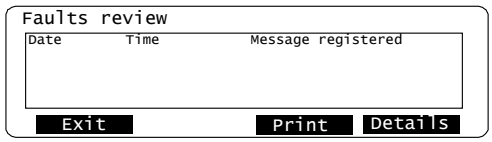
Displays (***Review*** menu of the Alarm displaying screen)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
	Faults review : permanent field ***Exit:*** To go back to the alarms displaying screen ***Print:*** To print the complete alarms review ***Details:*** To display the detailed alarm message	
Display 1 of the ***Review*** menu		
Press the ***Details*** key to access to the detail displaying screen of the alarm selected:		
		Next Display
	*Date:* date at which the failure occurs *Src:* state of the analyzer when the alarm occurs *Def:* alarm message displayed ***Exit***: to go back to the alarm displaying screen	Status: Idle, Running, Jacket preparation, Cleaning, Diagnostic
Details display the ***Review*** menu		

Table 17: Screens of ***Review*** menu of the alarms displaying screen

9. Configuration: the "Setup" menu

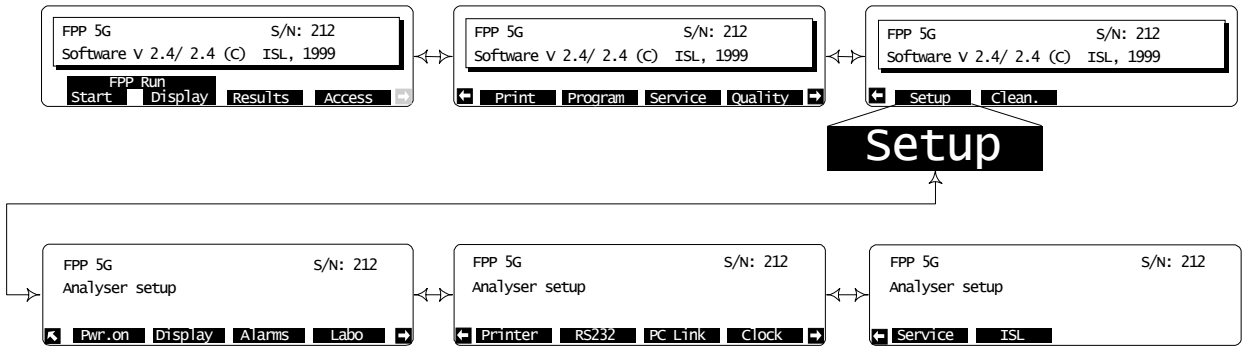


Diagram 8 : Setup menu

The FPP G5/s "working environment" can be completely configured. Thus the testing and cleaning programs in place when the device is switched on can be re-set. The triggering or stopping of an alarm can also be set for when a given error occurs and in other conditions set out below.
The configuration of the FPP 5G/s is carried out by means of the ***Setup*** menu at the main display level (see Figure 23 on page 2-38). After the ***Setup*** menu is activated the following display appears :

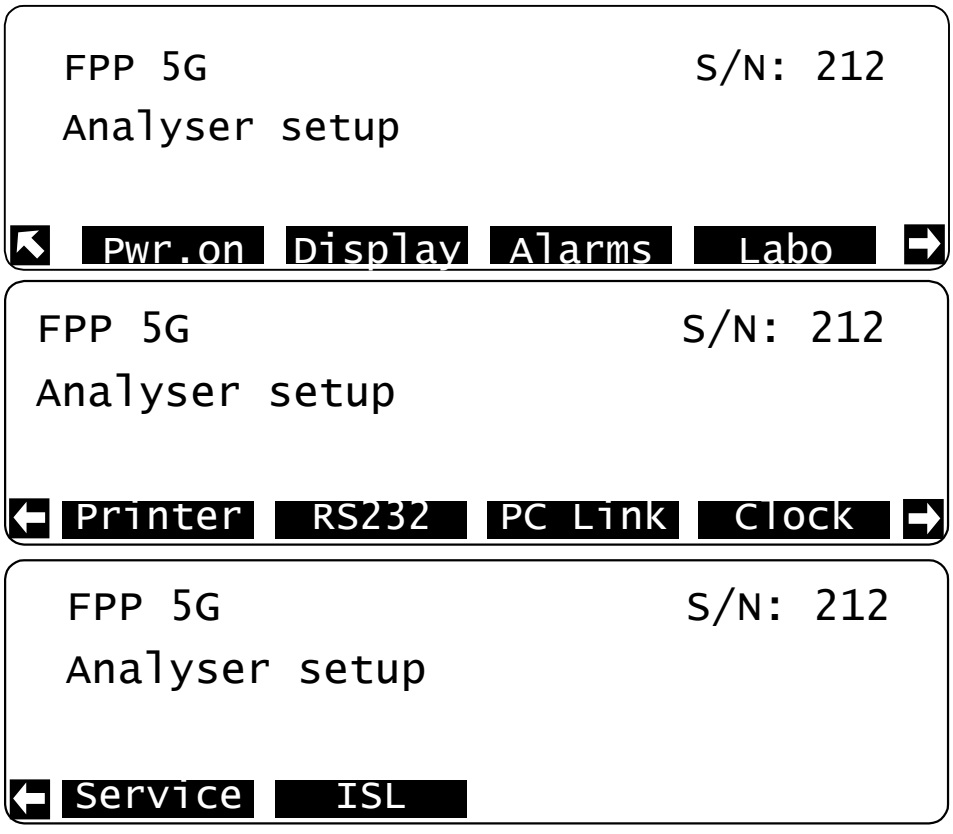


*Figure 41: **Setup** menu displays.*

The above displays allows access to the configuration parameters set out below.

9.1. Power on parameters: the "Pwr.on" menu

The ***Power on parameters*** menu allows choice of the test program, the cleaning program and the access level in place when the device is switched on.

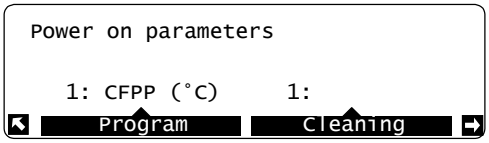
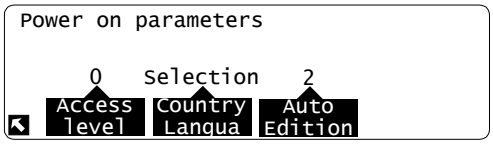
Displays (***Power on parameters***. menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 Display 1 of the ***Pwr. on*** menu	Power on parameters ***Program*** : Test program choice. ***Cleaning*** : Cleaning program choice.	 1 → 5 1 → 2
		Next display
 Display 2 of the ***Pwr. on*** menu	***Access level*** : choice of default access level when the device is switched on. ☞ ***: It should be noted that only the current access level or lower access level can be chosen.*** ***Country language***: choice of language selected by default (locked). "Selection" allows the operator to choose the language. ***Auto Edition*** : characters number needed to activate the auto edition (0 inhibits the function).	0, 1 or 2 Selection/English/ Français 0 → 9

Table 18: ***Power on parameters*** *menu displays.*

9.2. Configuring results display: the "Display" menu

Up and Down times, and temp. H can be displayed/printed in seconds or in tenths of seconds. Example :
Format 99 seconds ➔ time in seconds.
99.9 seconds ➔ time in tenths of a second.
A tenths of a second display is only possible with results obtained with version 1.5 of the control software and displayed in the ***Results*** Menu.
If the time is greater than 99.9 seconds, the display automatically switches to seconds.
A test which is running will always be displayed in seconds.

9.3. Configuring alarms: the "Alarm" menu

With this menu an audible alarm can be activated or de-activated for a given fault or indication. Activation of this menu calls up the following display:

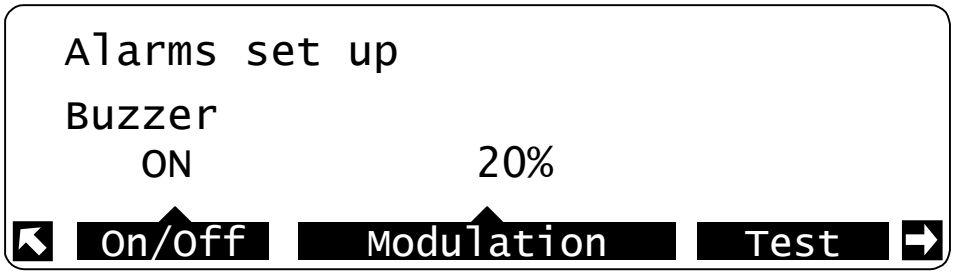


Figure 42: Alarms menu Display 1

With this menu the alarm can be activated or de-activated as a warning system, without, however, preventing the LED of the **ALARM STOP** lighting up**.** Reminder: pressing on this button reveals the error message content.
The intermittence of discontinuous alarms can be adjusted by means of the ***Modulation*** button (100% continuous alarm - 0% alarm mute).
Warnings, alarms and their corresponding messages are presented as follows:

9.4. Faults and indications

9.4.1. Programming

Alarm
Buzzer active = No/OFF => The buzzer is globally inhibited.
Buzzer active = Yes/ON The buzzer will be active or inhibited depending on the configuration of each active alarm or signal.
Buzzer OFF does not affect the alarm or the red LED but only the buzzer.
Buzzer modulation may be programmed for the signals, from 0% (buzzer off) to 100% (continuous buzz).

9.4.2. Faults

Faults are indicated by the red LED and a permanent buzz.
Releasing stops the buzzer, the LED remains lit as long as the fault is present.

Faults	Tests and complementary information	Effects
Memory code fault	Calculation and checksum comparison check made on powering-up. If this failure is reported, switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.	Inhibits testing.
Data memory fault	Write, then read, checks made on powering-up. If this failure is reported, switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.	Inhibits testing.
Saved memory fault	The battery for backing up the non-volatile back-up memory (NVRAM) has a service life of 7 to 8 years. This alarm may therefore be due to a faulty battery. The content of the saved RAM memory where the Analyzer parameters are stored is checked by the microprocessor. If there is an error, the Analyzer goes automatically into « download » mode so that the contents of the RAM memory saved can be restored by loading a backup file from a PC. For this purpose, a diskette containing the internal parameter factory settings (necessary if memory has not been recently uploaded) and a PC up/download program are shipped with the standard version of the Analyzer. Refer to the section 9.9.4 page 2-73on how to load the Analyzer parameters. **Note: So as to have an up-to-date copy of the Analyzer's internal parameters always to hand, it is advised to upload the internal parameters to the PC during routine maintenance operations.** Use a new file name each time this operation is performed. Do not use the internal parameter file name on the original diskette supplied with the Analyzer.	Machine blocked because loading of internal parameters requested.
Battery fault	Permanent check. The battery is used while the machine is stopped, for the dock and to save parameters stored in RAM. If the failure is reported: ↳Do not switch off the Analyzer as this will delete any stored data. ↳Print or upload to a PC file the Analyzer parameters contained in the non-volatile back-up memory, the NVRAM (see the section 9.9.4 page 2-73). ↳Switch off the Analyzer and call a qualified technician to replace the battery. Download Analyzer internal parameters or enter them. **Note: Regular uploading of the internal parameters must be programmed as part of the analyzer maintenance procedure. Use a new filename (e.g. with the current date in the name- PIDDMMYY. NVM). This way the latest version of the internal parameters will be saved to a file.**	
A/D converter fault	Permanent check made for absence of dialogue with converter.	Inhibits testing and stops a current test.
Upper optical fork fault	Check made at the end of light slaving (For the TLF, slaving is made before each suction) Fault condition if transmission is strong and reception is weak, or if transmission is weak and reception is strong Thresholds are not programmable Alarm stopped each time a test is run	Stops a current test
Lower optical fork fault	Check made at the end of light slaving (For the TLF, slaving is made before each suction) Fault condition if transmission is strong and reception is weak, or if transmission is weak and reception is strong. Thresholds are not programmable Alarm stopped each time a test is run	Stops a current test

Ambient light too strong	Permanent check on light received outside transmission period One alarm for both upper and lower detectors Two programmable thresholds: Average threshold + time to be taken into account => alarm and stop test Strong threshold with immediate recognition => alarm and stop test. Threshold limits : 0 to 4095 points Time : 0 to 120 seconds By default Threshold 1 : 1500pts after 5 seconds Threshold 2 : 2000pts Alarm stopped each time a test is run	Stop a current test.
Vacuum circuit fault	Check made on testing and cleaning Fault if pressure measured is outside limits Two thresholds programmable in % relative to the instructions Lower threshold (-ve) and upper threshold (+ve) + recognition time LimitsThreshold -ve : 0 to 100%csg Threshold +ve : 0 to 100%csg Time : 0 to 120 seconds By default Threshold -ve : 20%Threshold +ve : 20% Time : 10 seconds Alarm stopped each time a test is run. During cleaning, only the "Upper threshold exceeded" test is made.	Stops a current test
Cooling circuit fault	Checking is continuous. Fault condition if jacket temperature does not vary at least 1°C after 10 minutes for an SV cold command of 100%. Thresholds not programmable. Alarm is stopped each time a test is run.	Does not stop a test in progress.
Heating circuit fault	Checking is continuous. Fault condition if jacket temperature does not vary at least 1°C after 8 minutes for an SV heat command of 100%. Thresholds not programmable. Alarm is stopped each time a test is run.	Cuts the heat command and stops a test being run.
Sample temperature fault	Check made during test Fault condition if sample temperature is outside limits after recognition time. Two thresholds, programmable in °C. Lower threshold (-ve) and upper threshold (+ve) + recognition time (secs.). LimitsThreshold (-ve): -120°C to +55°C Threshold (+ve): -120°C to +55°C Time: 0-120s DefaultsThreshold (-ve): -100°C Threshold (+ve): +55°C Time: 30s Alarm is stopped each time a test is run.	Stops a test currently running
Jacket temperature fault	Checking is continuous. Fault condition if jacket temperature is outside limits after recognition time. Two thresholds, programmable in °C. Lower threshold (-ve) and upper threshold (+ve) + recognition time (secs.). LimitsThreshold (-ve): -120°C to +55°C Threshold (+ve): -120°C to +55°C Time: 0-120s DefaultsThreshold (-ve): -100°C Threshold (+ve): +55°C Time: 30s Alarm is stopped each time a test is run.	Stops a test currently running
Refrigerant temperature fault	Checking is continuous. Fault condition if jacket temperature is outside limits after recognition time. Two thresholds, programmable in °C. Lower threshold (-ve) and upper threshold (+ve) + recognition time (secs.). LimitsThreshold (-ve): -120°C to +55°C Threshold (+ve): -120°C to +55°C Time: 0-120s DefaultsThreshold (-ve): -120°C Threshold (+ve): +55°C Time: 30s	Does not stop a test currently running
Jacket preparation impossible	Indicated only during automatic preparation at end of test. During operator preparation, this alarm is not indicated, but simple screen messages appear. Possible type of problem; no jacket "level off" programmed in the cold profile.	
Test refused	Indicated only during testing by PC. During testing by PC, this alarm is not displayed, but simple screen messages appear. Allows problems to be indicated to PC. Possible type of problem; Alarms present which prevent test being run. Alarm is stopped each time a test is run.	

Verification test fails	Suction occurs at the beginning of a test if the program contains a request for verification. Fault condition if there is a blockage => Test stopped, result not saved. Alarm is stopped each time a test is run.	Alarm condition => test stopped, result not saved.
Badly positioned pipette	At the beginning of a test, if the upper or lower optical detectors give alarm condition => no pipette.	
Check position of sample probe	Check made during test Fault condition if sample temperature does not vary when difference between sample and jacket temperatures is great. (Fault condition if difference between sample and jacket temperatures >5°C and sample temperature variation <0.4°C.	Does not stop a test currently running
Cooling unit temperature safety	Turn off the analyzer. Clean the ventilation filters. Turn on the analyzer If the problem continues, contact ISL customer service.	
Cooling unit stroke safety	Contact ISL customer service.	
Cooling unit board link	Turn off the analyzer. Turn on the analyzer If the problem continues, contact ISL customer service.	

Table 19: List of alarms and the corresponding messages.

9.4.3. Indications

Indications are made by the red LED and an intermittent buzzer.
A release stops the buzzer and turns off the LED.

Indications	Complementary information
End of test with CFPP	Result storedCFPP = xx.x° Indication stopped each time a test is run.
End of test with CFPP at end of first suction	Result storedCFPP = xx.x° Indication stopped each time a test is run.
End of test on "Stop" temperature	The sample temperature has exceeded the "Stop" temperature set in the test program. Result storedStop on "Stop" temperature xx.x° Indication stopped each time a test is run.
End of cleaning	Indication at the end of cleaning cycles
Sample temperature reached	Comparison of sample temperature with alarm temperature set in the test program. Indication when sample temperature is low (apart from preheating) Indication stopped each time a test is run.
Jacket ready	Indication during jacket preparation, when jacket temperature reaches requested level +-0.25°C/+-0.45°F Indication stopped each time a test is run.
Anomaly detected on up/down times	Two parameters of FPP programs let the up and down times to be verified (refer to the Table3 page 2-47). If the time between two suctions decreases, this warning alarm is set off at the end of test and a message will be printed with the result.

Table20: List of indications.

9.5. Personalization and access authorization to level 1 : the "Labo." menu

The FPP 5G/s can be personalized and so bear the name of the laboratory that acquires it, together with the name of the head of the laboratory. He or she can restrict access to (write protect) certain parameters (e.g. the parameters associated with a standard). The following displays can be called up by activating the ***Labo.*** menu.

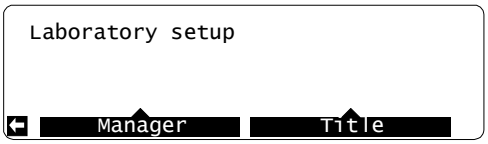
Displays (***Labo.*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 **Labo.** menu Display 1	***Access Code*** : access code to level 1. ***Lab Name*** : name of laboratory using FPP 5G/s	-32768 → 32767 String
		Next display
 **Labo.** menu Display 2	***Manager*** : name of laboratory manager. ***Title*** : title of laboratory manager.	String String

*Table 21: **Labo.** menu displays*

9.6. Printer configuration: the " Printer" menu

Printing configuration has been dealt with the section 4 - Printing out: the " Print" menu on page 2-41 of the current part.

9.7. FPP 5G/s ⇔ PC communication: the "PC Link" and "RS232" menus

The FPP 5G/s is an "open" device in more than one respect. Not only can it be completely parameterized, it can communicate with a PC through:

- the ALAN network, whose inlet and outlet ports are at the back of the device.
- the RS 232 C link.
- the service port (on the rear panel).

Each of these communication modes is specialized. Thus:

- The ALAN allows, if necessary, several (FPP 5G/s) analyzers to be interconnected and controlled from a PC.
- By means of the RS 232 C link the FPP 5G/s can send test results to a PC.
- The service port.

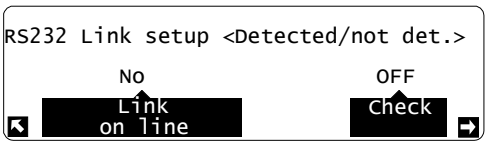
The parameters linked to each of the communication modes are set out below.

9.7.1. Setting up the RS232C link: the "RS232" menu

If the RS 232 C link is chosen as means of communication, it is necessary to have the requisite adapter supplied with the device. This has a series port on one side while connecting simultaneously to the inlet and outlet of the ALAN network. When the adapter is connected, the device automatically detects the presence of an RS 232 C link.
If the RS 232 C adapter is not detected then :

- The RS 485 PC link is declared “detected”
- The RS 232 link is declared “not detected”

The parameters of this link are presented in the table below:

Displays (menu ***RS 232.***).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***RS 232*** menu Display 1	***Link on line*** : link established. ***Check*** : sending of a link check frame : <(ISL FPP 5G)DB>	Yes/No ON/OFF
		Next display

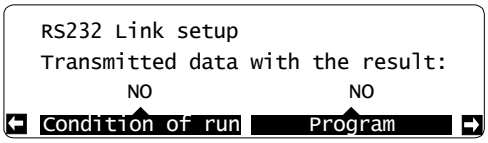
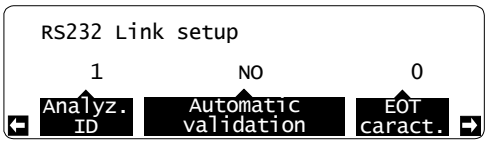
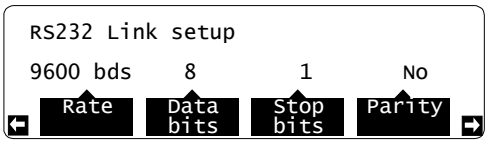
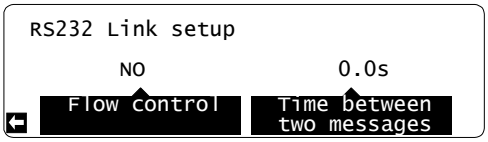
 ***RS 232***.menu Display 2	Data transmitted with result : ***Conditions of run*** : context of test (e.g. operator name, pressure unit) **Program** : test program carried out.	Yes/No Yes/No
		Next display
 ***RS 232***.menu Display 3	***Analyz. ID*** : identifying name of analyzer ***Automatic validation*** : automatic transmission of results at the end of the test. ***EOT caract.*** : end of transmission character (ASCII code).	Yes/No String
		Next display
 ***RS 232***.menu Display 4	***Rate*** : rate of transfer (in bauds) ***Data bit*** : data bits ***Stop bits*** : stop bits ***Parity*** : parity.	9600 bds 7/8 1/2 No/odd/ Even
		Next display
 ***RS 232***.menu Display 5	. ***Flow control*** : flow control ***Time between two messages*** : when there is no transfer protocol.	No RTS/CTS Xon/Xoff ENQ/ACK 0 → 10s

Table 22: ***RS 232.*** *menu displays*

9.7.2. Setting up the PC link: "PC Link" menu

With the PC Link menu the identification parameters of the analyzer (FPP 5G/s) in the ALAN network can be displayed and fixed.
When the ***PC Link*** menu is activated, the following displays appear:

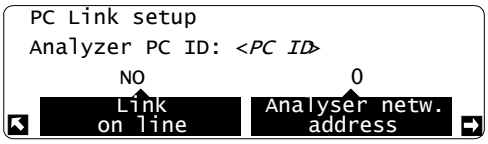
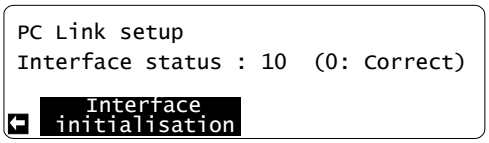
Displays (***PC Link***. menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***PC Link*** menu Display 1	Analyzer PC ID : identifying name of the analyzer on the ALAN network. ***Link on line*** : state of link between FPP5G and the PC. ***Analyrer netw. address*** : FPP 5G/s address on network	Yes/No 1 → 31
		Next display
 ***PC Link*** menu Display 2	Interface status : possible errors code linked to the FPP5G⇔PC interface. ***Interface initialization*** : initialization of FPP5G⇔PC interface.	

Table23: ***PC Link.*** *menu displays*

9.8. Date/Time setting : the "Clock." menu

The date and time are set by means of ***Clock***. menu. It is possible to change the date format according to the country in which the FPP 5G/s is being used.
When the ***Clock*** menu is activated the following display appears:

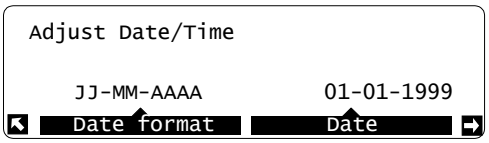
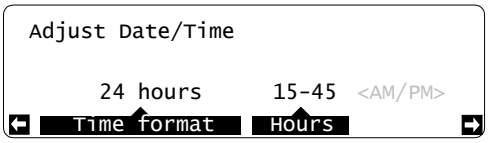
Displays (***Clock.*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Clock*** menu Display 1	***Date format*** : ***Date*** : date in the format selected	JJ-MM-AA MM-JJ-AA AA-MM-JJ AA-JJ-MM JJ-MM-AAAA MM-JJ-AAAA AAAA-MM-JJ AAAA-JJ-MM
		Next display
 ***Clock*** menu Display 2	***Time format*** ***Hours*** : time in the format selected	(12/24)h

Table 24: ***Clock.*** *menu displays.*

9.9. The "Service" menu

The ***Service*** menu is mainly dedicated to maintenance. It contains menus with which regulation parameters can be entered, and setting values and optical instrument detection parameters modified. This menu also contents software downloading commands and file loading command as well as a function to delete Ram memory content.
Activating the ***Service*** menu gives access to two displays:

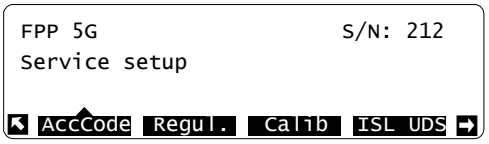
Displays (menu ***Service.***.).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Service.*** menu Display 1.	***AccCode*** : access code to level 2 (maintenance) ***Regul.*** : regulation parameters entry ***Calib.*** : entry of setting values for vacuum pump, sample temperature probe and jacket temperature probe. ***ISL UDS*** : software downloading commands and command for data transfer to PC.	32768 → 32767
		Next display
 ***Service.*** menu Display 2	***Detect*** : entry of optical detection parameters. ***Result memory reset:*** saved memory results deletion.	

Table25: ***Service.*** *menu displays*

9.9.1. Entering regulation parameters: the "Regul." menu

The regulation parameters can be entered directly on to the following display (Refer to the list of parameters supplied with the device):

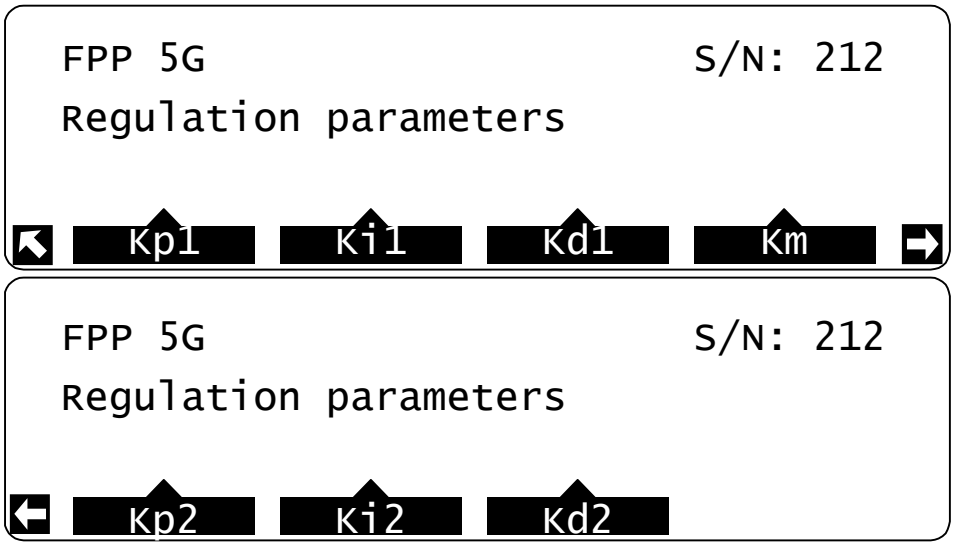


Figure 43 : Regul. menu display

9.9.2. Entering calibration values: the "Calib." menu

If data are lost, the calibration values can be entered directly on to the display below, without prior adjustment:

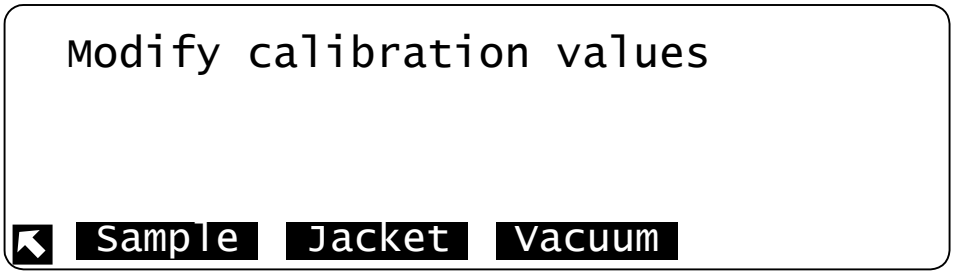


Figure 44: Calib. menu display

9.9.3. Modifying sample temperature adjustment values

High and low reference resistance values are related to the adjustment of the sample temperature. They are calculated by automatic adjustment and do not normally need modifying. If these values are modified manually this is indicated by an asterisk on the display and on the results print-out.

9.9.4. File upload/download commands: the "UDS" menu

The basic analyzer is delivered with a PC program for downloading internal parameters of a PC to the analyzer, and for receiving internal parameters of the non-volatile back-up memory. Downloading/Reception is made via the analyzer's standard RS-232C interface. It is also possible to update analyzer program code and software texts using an update diskette.
An external connection cable is standard equipment for data flow between PC and analyzer.
During downloading, modem signal management is not assured.
Downloading via the modem is made in two stages:
1.Distant downloading, PC-PC, via a modem.
2.Local downloading, PC-analyzer without a modem.
Downloading/Reception is a function special to this analyzer.
The analyzer is in this mode, either:

- by automatic detection of a download request or,
- by an explicit request made via the analyzer's keyboard.

In the first case, once the analyzer is in this mode, it can only quit when a connection has been made to the computer. In the second case, it is preferable not to try to quit download mode. Downloading causes memory loss. If an error is made, it is better to let the downloading continue, and then download again. If the operator stops the analyzer during downloading, the next time the analyzer is powered up it will automatically detect that a transfer is necessary.

9.9.4.1.Transfer procedure

The analyzer goes into download mode- either automatically, or requested by the user. It waits for a PC transmission.
When the downloading software is run on the PC, it sends a specific message to the analyzer.
In replying to this message, the analyzer indicates the type of downloading required, followed by a safety sequence.
The PC then sends data which is processed by the analyzer.
When the PC software considers the downloading finished, it validates this with a signal to the analyzer.

9.9.4.2.Installation and start-up of the downloading program

See instructions in "Read me" file.

9.9.4.3.User-requested transfer

Preparation

- Power down the PC and the analyzer and plug the cable into the serial connection on the back of the analyzer and the serial port of the PC.
- Power up the PC and the analyzer.

Analyzer

- Select the software downloading menu.
- Select the required functions. (The transfer will be to the PC.)

The analyser screen will display the type of transfer.

PC

- Start the transfer to the PC as explained in the "Read me" file (section 9.9.4.2 page 2-74).
- Enter the number of the serial communications (COM) port used (1 or 2).

Downloading analyzer program code and software texts

- Key in the data-file name – ISLFPP.Vxx (xx version of software code) and validate with ENTER. Key in the name and the extension of the file.

Downloading internal parameters

- Enter the required file name and then validate with ENTER. Key in the name and the extension of the file.

For downloading internal parameters to a PC, use a new file name for each download (for example, use the date as a name – IPDDMMYY.NVM

A display on the PC informs the operator of the type of operation running.

Analyzer

A display on the analyzer informs the operator of the type of operation running.

End of transfer

If the transfer was OK:

- The analyzer is automatically reinitialized.

9.9.4.4.Transfer fails or screen not lit

If the transfer fails, the analyzer will automatically detect a download request. Also, on powering up, if the analyzer screen does not light up, the analyzer will similarly detect a download request.

- Power down the PC and the analyzer.
- Power up the PC and the analyzer.
- Run the downloading program as explained above (in 9.9.4.3 page 2-74). If downloading is necessary, the analyzer will detect this automatically.

When the analyzer is waiting for a download, the red LED will flash every second.
A downloading in progress is indicated by rapid flashing which is related to the rate of data transfer.

The download and data transfer commands are accessible from the following displays:

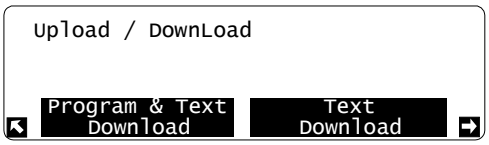
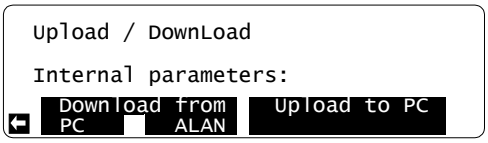
Displays (***UDS.*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).
 ***UDS*** menu Display 1.	Transfer/download ***Program & Text Download*** : control software and text fields download. ***Text Download*** : download of control software text fields
	Next display
 ***UDS*** menu Display 2	Internal parameters : ***Download from PC/ALAN*** : download from ALAN network. ***Upload to PC*** : data transfer to a PC.

*Table26: **UDS.** menu display*

9.9.5. Entering optical detection values: the "Detect" menu

The optical detection values can be entered on the following display (Refer to the list of parameters supplied with the device):

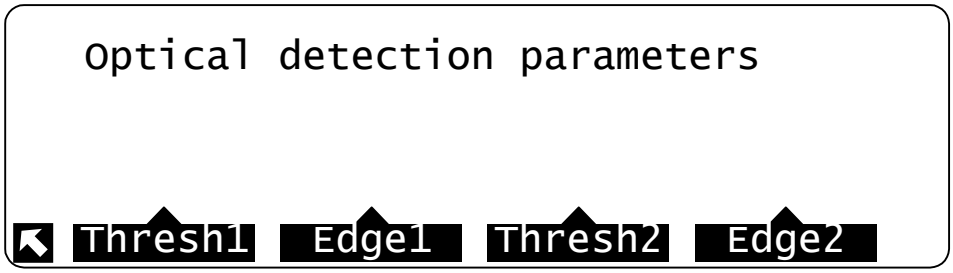


Figure 45: Detect. menu display

10.Access levels and password : the "Access" menu

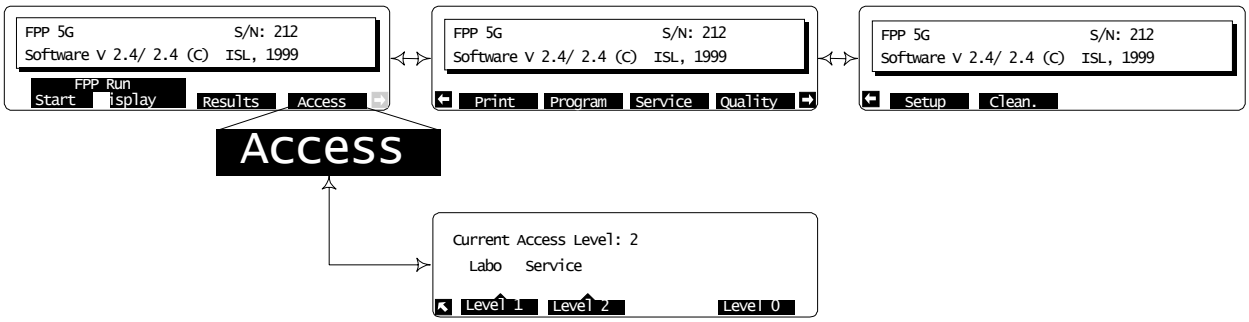


Diagram 1: The Access menu

If entry to a protected level is attempted, the following message is displayed, indicating the current level and the access level requested. The access codes can be entered by means of two buttons, ***Level1*** and ***Level2*** (see the ***Config./Labo*** menu for configuring the access code for level 1 laboratory. Also, see the ***Config./Maint*** menu for the definition of the access code for level 2 maintenance).

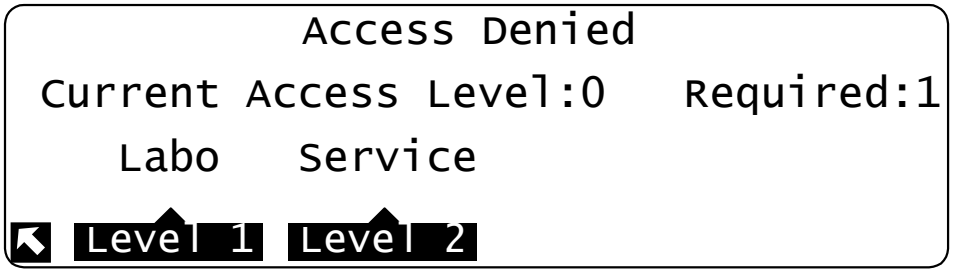


Figure 46: Access to level refused message, indicating that the level is write protected

The main display of the ***Access*** menu, shown below, enables access to a given level or, if necessary, to zero level.

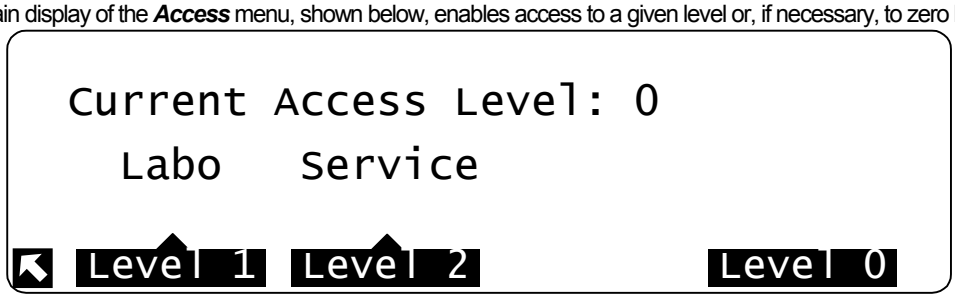


Figure 47: Access menu display

The (digital) access code is entered through the numeric segment. If the code is correct, access is achieved validation with the **ENTRY** key.

11. Cleaning programs: the "Clean." menu

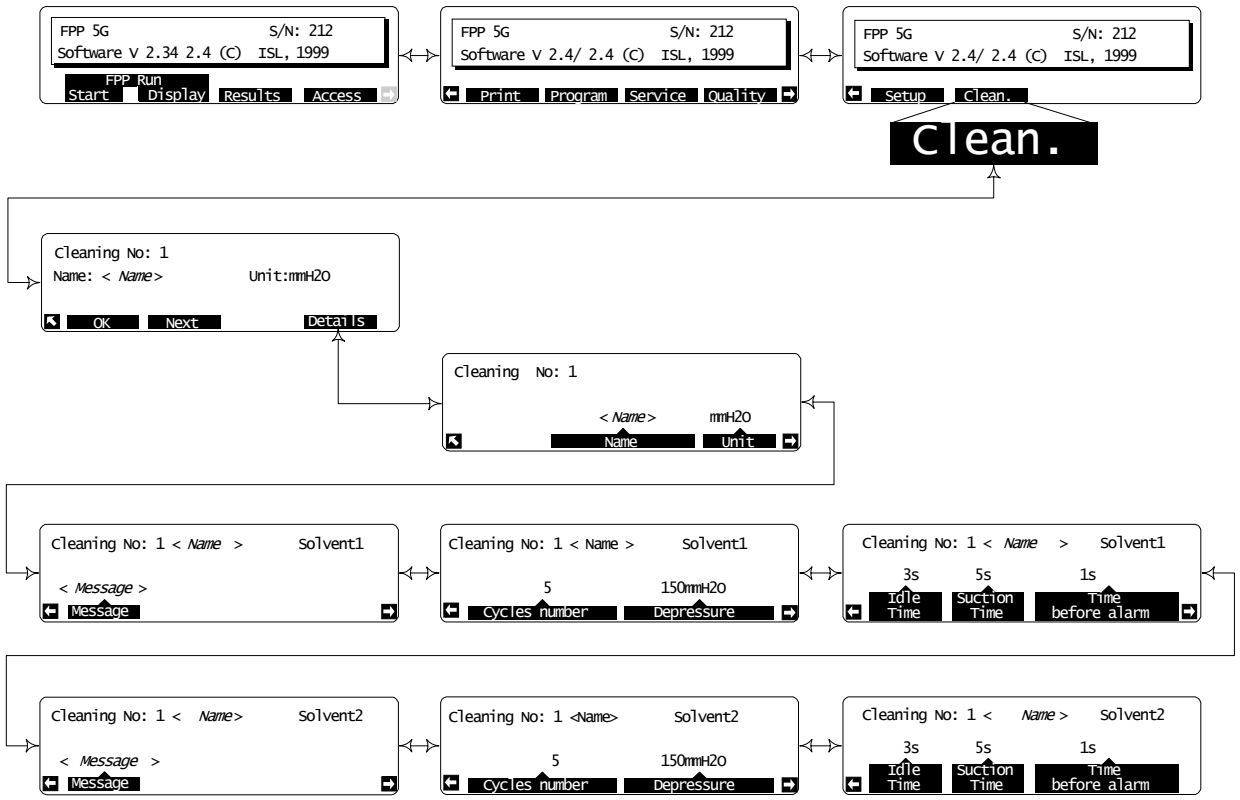


Diagram 2: The Clean menu.

As indicated previously, the FPP 5G has two cleaning programs. The choice of cleaning program depends on the needs of the user. A change of program can, for example, occur when there is a change in the nature of the sample. When the ***Clean***. menu is activated, the display below allows a choice of cleaning program:

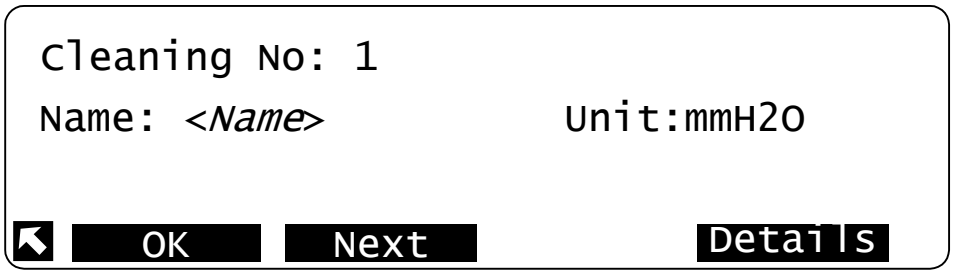


Figure 48: Clean menu Display 1

.

The **following displays** are set out in the table below:

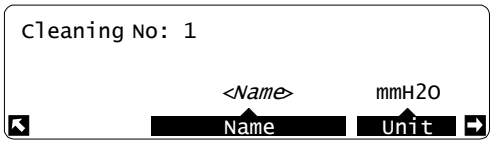
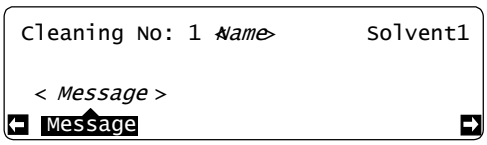
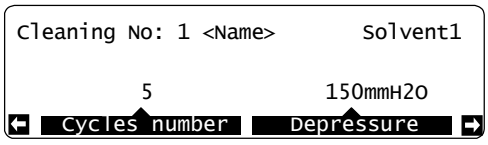
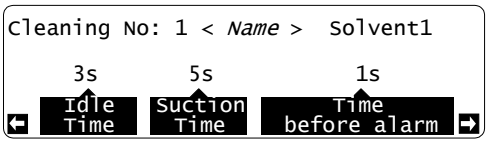
Displays (menu ***Clean.***).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
	Cleaning program No1 (Permanent field). ***Name*** : program name ***Unit*** : vacuum measurement unit.	String ⎧mmH2O ⎨Kpa ⎩mbar
Clean. menu Display 1		
		Next display
	Cleaning program No1 Solvent 1 or cleaning solvent ***Message*** : entry of informative message for operator.	String
Clean. menu Display 2		
		Next display
	***Cycles number*** : number of suctions. ***Depressure*** : level of vacuum necessary for suction of solvent	1 → 50 (100 →220) mmH2O
Clean. menu Display 3		
		Next display
	***Idle Time*** : idle time between suctions. ***Suction Time*** : duration of suction. ***Time before alarm*** : time at end of cycle before triggering of alarm to indicate to operator need to change solvent.	1 → 999s 1 → 999s 1 → 999s
Clean. menu Display 4		
		Next display
Similarly with second solvent.		

Table 27: ***Clean.*** *menu display*

Appendix A - Examples of printout types

Page intentionally blank.

1 - 40 column result printout

07/10/2003 09:49 ISL FPP 5Gs
Software V 2.4/ 2.4 S/N: 241
ALAN ID: ISL FPP 5Gs
Sample ID:2003 No:
Cloud : -5.0°C
Program : 1 CFPP (°C)
Operator :
CFPP: -22.0°C
at filling up during the step 3
Date: 04/02/2003 Time: 23:46
Anomaly detected at –20.0°C
Anomaly detected at –21.0°C

Result

Time	Durat.	Temp.	Up	Down
0"		0.0°C	4	4
2'06"	2'06	-1.0°C	4	4
3'51"	1'45	-2.0°C	4	4
5'24"	1'33	-3.0°C	4	4
6'52"	1'28	-4.0°C	4	4
8'21"	1'29	-5.0°C	5	4
9'55"	1'34	-6.0°C	5	4
11'32"	1'37	-7.0°C	5	5
13'22"	1'50	-8.0°C	6	5
15'23"	2'01	-9.0°C	6	5
17'22"	1'59	-10.0°C	6	5
19'24"	2'02	-11.0°C	7	6
21'42"	2'18	-12.0°C	7	6
24'14"	2'32	-13.0°C	7	6
27'01"	2'47	-14.0°C	8	6
30'10"	3'09	-15.0°C	8	8
33'38"	3'28	-16.0°C	9	9
37'26"	3'48	-17.0°C	10	14
41'49"	4'23	-18.0°C	12	16
46'51"	5'02	-19.0°C	15	31
53'13"	6'22	-20.0°C	23	17
57'44"	4'31	-21.0°C	33	10
1h00'46"	3'02	-22.0°C	60	

Suctions

Program No: 1 Name: CFPP (°C)
Type of analysis: CFPP
One test for checking: YES
First test at 5°C or Cloud+ 5°C
Alarm at -55.0°C Stop at -51.0°C
Maximum up time: 60 s
Allowed down time: 10 s
Display/Print Detection : YES
Anomalies Up Time: 20% Down Time: 20%

Program

Cooling No: 1 Name:CFPP
Step :
1 Sample preheating at 45.0°C
for 0 min
No test.
2 Jacket level at -34.0°C
until sample < -20.0°C
test every 1.0°C
3 Jacket level at -51.0°C
until sample < -35.0°C
test every 1.0°C
4 Jacket level at -67.0°C
until sample < -70.0°C
test every 1.0°C
5 Final heating, jacket temp. 25.0
No test.
6 End of profile

Cooling profiles

Vacuum profile No: 1 Name:CFPP
Type:CFPP
Segment :
1 Constant at 200mmH2O.

Vacuum profile

2 - 80 column result printout

Result

```
07/10/2003 09:50     ISL  FPP 5Gs     Software V 2.4/ 2.4   S/N:  241
ALAN ID:ISL FPP 5Gs
 Sample ID:2003        No:           Cloud   :  -5.0°C
 Program  :  1 CFPP (°C)             Operator :
 CFPP: -22.0°C                  at filling up during the step  3
 Date: 04/02/2003   Time: 23:46
```

Suctions

Time	Durat.	Temp.	Up	Down	TempH	TimeH
0"		0.0°C	4	4	3.6°C	19
2'06"	2'06	-1.0°C	4	4	1.8°C	16
3'51"	1'45	-2.0°C	4	4	0.4°C	16
5'24"	1'33	-3.0°C	4	4	-0.8°C	16
6'52"	1'28	-4.0°C	4	4	-1.9°C	14
8'21"	1'29	-5.0°C	5	4	-2.9°C	15
9'55"	1'34	-6.0°C	5	4	-4.1°C	15
11'32"	1'37	-7.0°C	5	5	-5.3°C	14
13'22"	1'50	-8.0°C	6	5	-6.1°C	16
15'23"	2'01	-9.0°C	6	5	-6.9°C	16
17'22"	1'59	-10.0°C	6	5	-7.5°C	17
19'24"	2'02	-11.0°C	7	6	-8.0°C	18
21'42"	2'18	-12.0°C	7	6	-9.1°C	17
24'14"	2'32	-13.0°C	7	6	-9.9°C	19
27'01"	2'47	-14.0°C	8	6	-10.6°C	19
30'10"	3'09	-15.0°C	8	8	-11.5°C	21
33'38"	3'28	-16.0°C	9	9	-12.5°C	23
37'26"	3'48	-17.0°C	10	14	-13.3°C	28
41'49"	4'23	-18.0°C	12	16	-14.2°C	31
46'51"	5'02	-19.0°C	15	31	-15.5°C	51
53'13"	6'22	-20.0°C	23	17	-15.9°C	44
57'44"	4'31	-21.0°C	33	10	-15.5°C	49
1h00'46"	3'02	-22.0°C	60	-21.8°C	6	

Program

```
Program No:  1 Name: CFPP (°C)
 Type of analysis: CFPP              One test for checking: YES
 First test at   5°C or Cloud+  5°C   Alarm at  -55.0°C  Stop at  -51.0°C
 Maximun up time:  60 s              Allowed down time:  10 s
 Display/Print  Detection : YES       Anomalies Up Time:  0% Down Time:  0%
```

Cooling profiles

```
Cooling profile No:  1 Name:CFPP
 Step :
  1 Sample preheating at  45.0°C for   0 min
    No test.
  2 Jacket level at  -34.0°C until sample <  -20.0°C
    test every 1.0°C
  3 Jacket level at  -51.0°C until sample <  -35.0°C
    test every 1.0°C
  4 Jacket level at  -67.0°C until sample <  -70.0°C
    test every 1.0°C
  5 Final heating, jacket temperature   25.0
    No test.
  6 End of profile
```

Vacuum profile

```
Vacuum profile No:  1 Name:CFPP
 Type:CFPP
 Segment :
  1 Constant at   200mmH2O.
```

3 - 80 column internal parameter printout

07/10/2003 09:50 ISL FPP 5Gs Software V 2.4/ 2.4 S/N: 241
ALAN ID:ISL FPP 5Gs

Internal parameters

Sample Temp. measurement calibration Next calibration date: 04/17/2004
Calibration frequency: 365 days Start test refusal: NO
-50°C/ -58°F: 80.310 ohms A/D: 88DF5D +50°C/+122°F: 119.400 ohms A/D: CBA045

Sample probe corr table:

-100°C: 0.0	-90°C: 0.0	-80°C: 0.0	-70°C: 0.0
-60°C: 0.0	-50°C: 0.0	-40°C: 0.0	-30°C: 0.0
-20°C: 0.0	-10°C: 0.0	0°C: 0.0	10°C: 0.0
20°C: 0.0	30°C: 0.0	40°C: 0.0	50°C: 0.0
60°C: 0.0	70°C: 0.0	80°C: 0.0	90°C: 0.0

Jacket Temp. measurement calibration
Set point: 10.00°C correction: 0.81°C Set point:-34.00°C correction: 0.16°C

Vacuum measurement calibration at 0 mmH2O correction:FFF854
Vacuum measurement calibration at 200 mmH2O A/D: 7B922 D/A: 1AC
Vacuum measurement calibration at 160.0 mbar A/D:3F0902 D/A: BD3

Power on parameters Access level:0 Auto edition:2
Program : 1 CFPP (°C) Cleaning: 1 HEPTANE
Time display format: 99 seconds

Printer setup Automatic results printing: YES
Results printing with Program :YES Aspirations: YES
Printer:80 columns Degree: 91 Feed: 2 lines

RS232 setup
Transmitted data with the result Conditions of run: NO Program: NO
On line : NO Analyzer ID : 1 Automatic result validation : NO
Rate : 9600 Data bits : 8 Stop bits: 1 Parity : NO
End of transmission character : 0 Flow control : NO
Time between two messages if no flow control used : 0.1 s

PC link setup ID:ISL FPP 5Gs On line: YES Address:22
Date/time setup Date:MM-DD-YYYY Time:24 hours

Laboratory setup Laboratory name:
Laboratory Manager name: Title:
Alarms setup Buzzer :ON Modulation: 30 %
Prom :ON Ram :ON Safe mem:ON Keyboard:ON Screen :ON Battery :ON
AD Cnv :ON Upper OD:ON Lower OD:ON A. light:ON t1:1500 5s t2:2000
Vacuum :ON t-: 20 % t+: 20 % 10 s Cooling :ON Heating :ON
Sample T:ON t-:-100°C t+: 55°C 30 s Jacket T:ON t-:-112°C t+: 55°C 10 s
Refrig.T:ON t-:-120°C t+: 55°C 30 s PrepaJaq:OFF RunRefus:OFF ChkTest :ON
Pipette :ON ChkProbe:ON Cu Temp: ON Cu Stoke:ON Cu board:ON End Cfpp:ON
End1Aspi:ON EndStopT:ON EndRehea:ON EndClean:ON End Dry :ON TmpReach:ON
TmpPrepa:ON

Regulation parameters
Kp1: 25.0 Ki1: 0.40 Kd1:225.0 Km:10.0 Kp2: 6.0 Ki2: 0.10 Kd2: 0.0
Kcf1: 0 Kcf2: 30
Optical detection parameters ThresholdL: 150 EdgeL: 350
ThresholdH:4095 EdgeH: 300

ISL 400/DFFF -1/FFFF 2.4/A9F4 2.4/41DD 1/ 4 06/16/2003 10

```
Cooling unit parameters
S/N :M100B3#372   11/04/2002        Runs:  125      12/06/2002
   704:43      152:05       6:51      13:37      12:50       1:16
    0:00       0:00        0:00

11/04/2002  12  241      100 %
  17   1min24  230
   0   2min17  231
  -9   2min48  234
 -17   3min18  233
 -34   4min29  237
 -51   5min55  239
 -68   7min40  239
 -87  10min18  239

11/04/2002             100 %
  17   1min24  230
   0   2min17  231
  -9   2min48  234
 -17   3min18  233
 -34   4min29  237
 -51   5min55  239
 -68   7min40  239
 -87  10min18  239
```

4 - 80 column calibration ticket printout

```
07/10/2003 09:50     ISL  FPP 5Gs     Software V 2.4/ 2.4   S/N:  241
 ALAN ID:ISL FPP 5Gs

Calibration ticket

Sample Temp. measurement calibration
  Operator: MD                    Calibration reference: SV0513
  Calibration performed: 04/17/2003      Next calibration    : 04/17/2004
  -50°C/ -58°F:  80.310 ohms A/D: 88DF5D  +50°C/+122°F: 119.400 ohms A/D: CBA045
  Sample probe corr table:

Jacket Temp. measurement calibration
  Operator: SM                    Calibration reference: 7171
  Set point: 10.00°C correction: 0.81°C   Set point:-34.00°C correction: 0.16°C

Vacuum measurement calibration         at     0 mmH2O     correction:FFF854
 Vacuum measurement calibration         at   200 mmH2O A/D: 7B922 D/A:   1AC
  Operator: MD                    Calibration reference: V21001
 Vacuum measurement calibration         at 160.0 mbar  A/D:3F0902 D/A:   BD3
  Operator:                       Calibration reference:

Laboratory name:
 Laboratory Manager name:             Title:

Comments:
 Date:          Signature:
```

5 - 80 column measurement printout

```
 07/10/2003 09:50     ISL  FPP 5Gs     Software V 2.4/ 2.4   S/N:  241
  ALAN ID:ISL FPP 5Gs

Measures
    Sample temperature:   24.7°C          R:109.62ohms   A/D:BAEC
    Jacket temperature:   25.0°C          R:110.13ohms   A/D:BBF4
    Cooling :   0.0%   0 Flags: 00000011   Heating :   0.0%   5
    Pump    :    0mmH2O D/A:     0      Pressure :    0mmH2O A/D:    0
    Aspi. SV : OFF                     Air SV   : OFF
    Upper OD  Em:   0 pts  Rec:   5 pts   Lower OD  Em:   0 pts  Rec:   0 pts

07/10/2003 09:51     ISL  FPP 5Gs     Software V 2.4/ 2.4   S/N:  241
  ALAN ID:ISL FPP 5Gs
```

6 - 80 column test printout

```
Printer checking
 !"#$%&'()*+,-./@ABCDEFGHIJKLMNOPQRSTUVWXYZ^?`abcdefghijklmopqrstuvwxyz aeee °
```

Appendix B - RS232 link features on FPP 5G/s

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In this document, ***analyzer*** is used for the ISL FPP 5G/s while ***host computer*** designates the computer to which the ISL FPP 5G/s is connected.

1 - Interface features

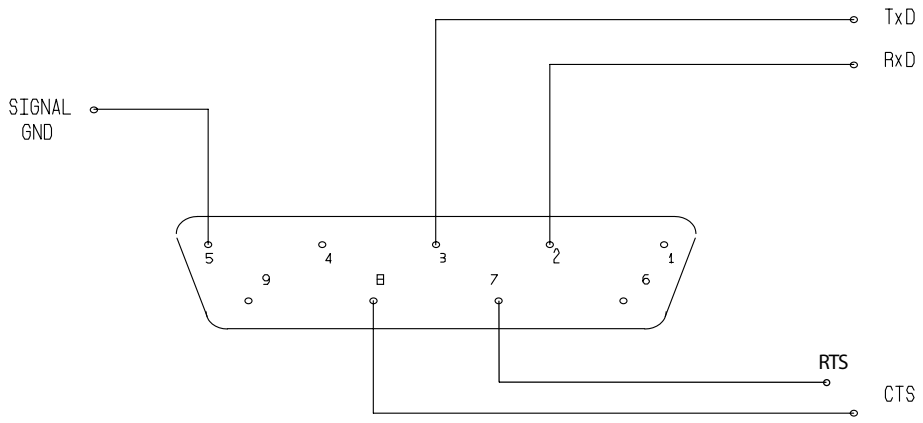
EIA-RS 232C serial link

Rate : 300 to 19200 bps
Data bits : 7, 8
Stop bits : 1, 2
Parity : none, odd, even

Switchable on-line / off-line state
Pre-defined message transmission available for test
Possibility to define an identifier (number) for the analyzer
Possibility to activate result auto-validation.
Automatic detection of the RS232 interface cable adapter

2 - OUTLET CONNECTOR BROACHING

The RS 232C connector of the adapter is a 9-pin connector. The pin configuration is as shown below.



EIA RS 232C interface

Line status in standby: +12 V (MARK),
Input signals used: CTS / RTS.

3 - Communication protocols

Flow control / Protocol can be :

- None
- RTS / CTS
- Xon / Xoff
- ENQ / ACK

Flow control	Type	Comments	
None		Transmitted messages are sent **without any way to stop them** from the host computer. However, a special parameter ("Time between two messages") in the ISL analyzers allows to define a pause between to successive message from 0.0 s to 10.0 s (by step of 0.1 s) *Note : This time is applied between 2 entire messages (not between characters)*	
RTS / CTS	Hardware	Existing signals defined in the RS232 interface standard are used to control the transmission. Connect the host computer serial RTS signal to the analyzer CTS signal. When the input buffer of the host computer is full, the RTS signal changes its state. Seeing its CTS signal changing, the analyzer stops transmission until CTS changes again. *Note: This **hardware handshake is controlled by the communication hardware devices** and can stop / restart transmission between any characters*	
Xon / Xoff	Software	This well-known handshake is qualified as "software protocol" because it is **controlled by the host computer reception software to control the data flow**. If the software needs time to process the last incoming message, it can send the Xoff character to the analyzer which immediately stops the transmission, until it receives from the host computer the Xon character.	Xon = 11H Xoff = 13H
ENQ / ACK	Software	This is a full protocol. It allows **flow control and data acknowledgment**. The transmission is fully controlled by the host computer which must send a ENQ (enquiry) character. Any message must be acknowledged by the host computer by sending a ACK character. *Note : There is no need to define a time between messages because the message sequencing keeps pace with the ENQs sent by the host computer.*	Developed by ISL this protocol is detailed below.

4 - ENQ / ACK protocol details

All messages from the analyzer must be acknowledged by the host computer.
Should communication fail, only the host computer can decide whether or not to abort transmission.

Analyzer response time on receiving ENQ:	< 100 ms
Waiting time for message acknowledgment:	2 sec
Results transfer delay after end of test (delay for ENQ) :	not limited
Number of transmission of the same result message on receiving NAK:	not limited (end with ACK or EOT reception)

Request, reception and acknowledgement of results

The host computer uses the ENQ code (05H) to ask the analyzer if any results are ready to be sent.
If the analyzer has no results to send, it replies ACK (06H). the host computer does not have to reply to this ACK.

	ANALYZER		HOST COMPUTER
No result available		◄———	**ENQ**
No result	**ACK**	———►	

If the analyzer has results, it starts their transmission.
On receiving the message, the host computer must check it (checksum) and must reply ACK (06H) or NAK (15H), depending on whether the message was correct or not.
If there are several fruitless communications, the host computer may decide to abort transmission by sending an EOT (04H) character.

	ANALYZER		HOST COMPUTER
Successfull transmissions		◄———	**ENQ**
1 result message	**XXXXX**	———►	
		◄———	**ACK**
		◄———	**ENQ**
Next result	**YYYYY**	———►	
		◄———	**ACK**
		◄———	**ENQ**
No more result	**ACK**	———►	

	ANALYZER		HOST COMPUTER
Result sent, faulty reception		◄———	**ENQ**
1 result message	**XXXXX**	———►	(not properly received)
		◄———	**NAK**
		◄———	**ENQ**
Same message	**XXXXXX**	———►	(not properly received)
		◄———	**NAK**
		◄———	**ENQ**
Same message	**XXXXXX**	———►	(not properly received)
Host ends the communication		◄———	**EOT** Abort

5 - Transmitted data

Example:
(1,"R ","ISL 3419 ","E8-N-05 ", 1,99, 0, -15.0, -32.0,9999.9,9999.9,9999.9, 1," ")69
(1,"C ","LG", 99, 99, 9, 999.9, 0, 9, 999.9, "28/04/1999", 4,"12:29 ")46
(1,"T1", "CFPP (°C) ", 0, 0, 0, 10, 5, -25.0, -70.0, 60, 60, 1)13
(1,"T2", 1, "CFPP(p+0.5C)", 0)EC
(1,"T2", 1, 3, 45.0, 0.0, 0, 0.0)57
(1,"T2", 2, 4, -33.5, -20.0, 1, 1.0)89
(1,"T2", 3, 4, -50.5, -35.0, 1, 1.0)8F
(1,"T2", 4, 4, -66.5, -70.0, 1, 1.0)96
(1,"T2", 5,13, 25.0, 0.0, 0, 0.0)6A
(1,"T2", 6, 1, 0.0, 0.0, 0, 0.0)41
(1,"T3", 1, "CFPP ", 0)2B
(1,"T3", 1, 2, 200.00, 0)9C

The data which can be transmitted are divided in 5 groups :

Group	Contents	Transmitted...
Results	See messages R below	Always
Run context	See message C below	If defined in the RS232 Link setup
Program used	See message T_1 below	If defined in the RS232 Link setup
Cooling profile used	See message T_2 below	If defined in the RS232 Link setup
Vacuum profile used	See message T_3 below	If defined in the RS232 Link setup

To be transmitted, a result must be validated.

- manual validation must be performed at the analyzer level. The transmission is possible after the validation.
- automatic validation can be set in the RS232 Link setup. The transmission is possible as soon as the distillation run ends.

5.1 - Message format

Messages are transmitted in ASCII code.
Character strings are enclosed within " " (double quotes).
They start with an opening bracket **(**
They finish witha closing bracket **)** , 2 characters **CK** , and the characters : **CR, LF** and **EOT**

- CK (2 characters) = checksum = the 2 least significant digits (expressed in ASCII) of the result of the hexadecimal sum of all the preceding characters, including the brackets.
- CR (1 non printable character) = Carriage Return = 0Dh
- LF (1 non printable character) = Line Feed = 0Ah
- EOT (1 non printable character) = End Of Transmission character, programmable in the RS232 configuration menu (if = 0 , there is no end of transmission character)

5.2 - Result messages

The CFPP result is sent using the R message.
Example: (1,"R ","ISL 3419 ","E8-N-05 ", 1,99, 0, -15.0, -32.0,9999.9,9999.9,9999.9, 1," ") 69

Meaning of result message fields from left to right

R message

Field name	Format	Number of characters	Field value	Example
Analyzer no	from 00 to 99	2		1
Message type	string	2	R =result	R
Sample ID	string	12		ISL 3419
Sample no.	string	12		E8-N-05
Test program no.	from 00 to 99	2		1
Reserve	99	2		99
Temperature unit	00 to 01	2	0=°C, 1=°F	0
Cloud point	-999.9 to 9999.9	6		-15.0
Results	-999.9 to 9999.9	6		-32.0
Reserve	9999.9	6		9999.9
Reserve	9999.9	6		9999.9
Reserve	9999.9	6		9999.9
Type of test end	00 to 05	2	0 = stopped by the operator, 1 = plugging at filling up 2 = plugging at flow back in Simul, 3 = plugging at flow back in CFPP, 4 = stop temperature reached, 5 = end of cooling profile	1
Calibration to be done	string	1	' '= OK, '*'= to be done	<>
Checksum		2	Sum of all the characters	69

5.3 - Context message

The context of the run is sent in one single message C
Example : (1,"C ","LG", 99, 99, 9, 999.9, 0, 9, 999.9, "28/04/1999", 4,"12:29 ") 46

C message

Field name	Format	Number of characters	Field value	Example
Analyzer no	de 00 a 99	2		1
Message type	string	2	C =context	C
Operator name	string	12		LG
Reserve	99	2		99
Reserve	99	2		99
Reserve	9	1		9
Reserve	999.9	5		999.9
Pressure unit	from 00 to 02	2	0=mmH20, 1=mbar, 2=Kpa	0
Reserve	9	1		9
Reserve	999.9	5		999.9
Date	string	10		28/04/1999
Date format	from 00 to 07	2	0 : JJ-MM-AA 1 : MM-JJ-AA 2 : AA-MM-JJ 3 : AA-JJ-MM 4 :JJ-MM-AAAA 5 : MM-JJ-AAAA 6 : AAAA-MM-JJ 7 : AAAA-JJ-MM	4
Hour	string	6		12:29
Checksum		2	Sum of all the characters	46

5.4 - Program message

The "program" information is sent in one single message T_1.
Example : (1,"T1", "CFPP (°C) ", 0, 0, 0, 10, 5, -25.0, -70.0, 60, 60, 1)13

T_1 message

Field name	Format	Number of characters	Field value	Example
Analyzer no	from 00 to 99	2		1
Message type	string	2	T1=test program	T1
Program name	string	12		CFPP (°C)
Temperature unit	00 or 01	2	0=°C, 1=°F	0
Test type	00 at 01	2	0=CFPP, 1=Simul	0
Checking test	00 or 01	2	0=no test, 1=test	0
Start temperature	-99 at 999	3		10
Tmp start at cloud +	00 at 999	3		5
Alarm temperature	999.9 at 9999.9	6		-25.0
Stop temperature	99.9 at 9999.9	6		-70.0
Max up time	000 at 999	3	In seconds	60
Min down time	000 at 999	3	In seconds	60
Display/print end type	00 at 01	2	0=no display, 1=display	1
Checksum		2	Sum of all the characters	13

5.5 - Cooling profile message

The cooling profiles are sent in several messages T_2. Each message corresponds to one step.
Example : (1,"T2", 1, "CFPP(p+0.5C)", 0)EC
(1,"T2", 1, 3, 45.0, 0.0, 0, 0.0)57
(1,"T2", 2, 4, -33.5, -20.0, 1, 1.0)89
(1,"T2", 3, 4, -50.5, -35.0, 1, 1.0)8F
(1,"T2", 4, 4, -66.5, -70.0, 1, 1.0)96
(1,"T2", 5,13, 25.0, 0.0, 0, 0.0)6A
(1,"T2", 6, 1, 0.0, 0.0, 0, 0.0)41

T_2 message

Field name	Format	Number of characters	Field value	Example					
Heading (1 message)									
Analyzer no.	00 to 99	2		1					
Message type	string	2	T2 : Cooling profile	T2					
Cooling profile no.	01 to 05	2		1					
Cooling profile name	string	12		CFPP(p+0.5C)					
Temperature unit	00 to 01	2	0=°C, 1=°F	0					
Checksum		2	Sum of all the characters	EC					
Cooling profile stages (1 message per stage)									
Analyzer no.	00 to 99	2		1					
Message type	string	2	T2 : Cooling profile	T2					
Stage no.	00 to 20	2		1	2	3	4	5	6
Stage type	00 to 13	2		3	4	4	4	13	1
Setting		-999.9 to 9999.9	6 characters	45.0	-33.5	-50.5	-66.5	25.0	0.0
Limit		-999.9 to 9999.9	6 characters	0.0	-20.0	-35.0	-70.0	0.0	0.0
Test type	00 to 02	2	0=pas de test, 1=test/°C, 2=test/min	0	1	1	1	0	0
Test frequency	-99.9 to 999.9	5		0.0	1.0	1.0	1.0	0.0	0.0
Checksum		2	Sum of all the characters	57	89	8F	96	6A	41

5.6 - Vacuum profile message

The vacuum profiles are sent in several messages T3. Each message corresponds to one step.
Example : (1,"T3", 1, "CFPP ", 0)2B
(1,"T3", 1, 2, 200.00, 0)9C

T_3 message

Field name	Format	Number of characters	Field value	Example
Heading (1 message)				
Analyzer no	00 to 99	2		1
Message type	string	2	T3 : vacuum profile	T3
Vacuum profile no.	01 à 02	2		1
Vacuum profile name	string	12		CFPP
Pressure unit	00 à 02	2	0=mmH20, 1=mbar, 2=Kpa	0
Check sum		2	Sum of all the characters	2B
Segments (1 message per segment)				
Analyzer no	00 to 99	2		1
Message types	string	2	T3 : Vacuum profile	T3
For the attention of: Segment no.	01 to 06	2		1
Segment type	00 to 03	2	0= nd, 1=end, 2=constant, 3=dynamic	2
Pressure setting	–999.99 to 9999.99	7		200.00
Limits	000 à 999	3		0
Check sum		2	Sum of all the characters	9C

5.7 - RS 232C link check message

(ISL FPP 5G) DB

6 - RS232 cost

There is neither option, nor extra fee for RS232 software and hardware (including the RS232 cable adapter) which is provided as standard.

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Appendix C - Diagrams

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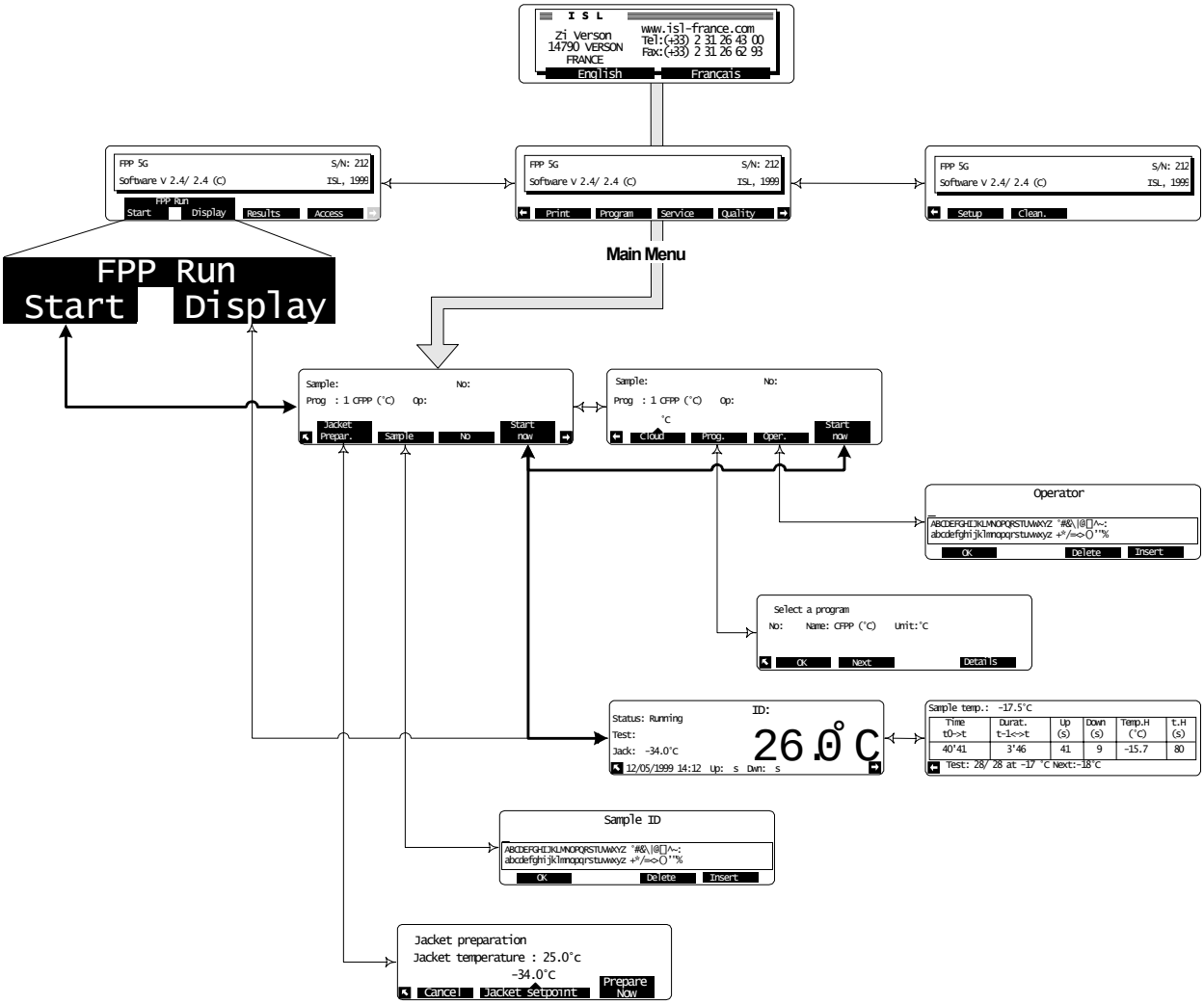
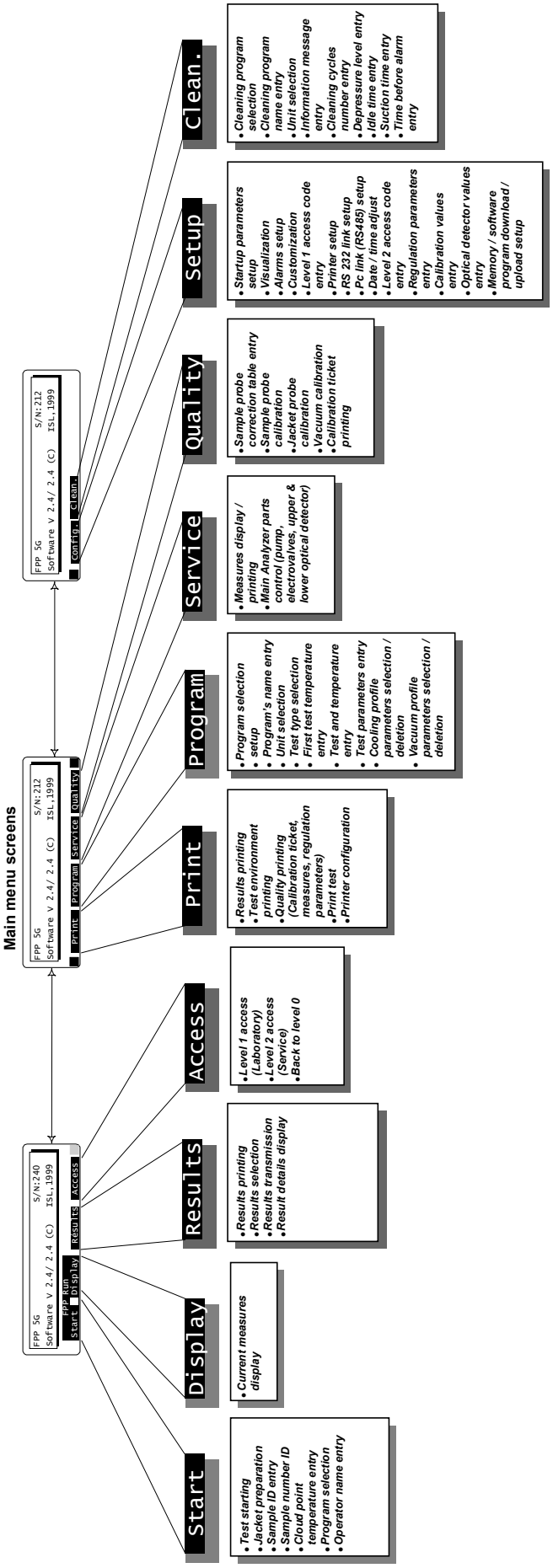
1 - Test launch diagram



2 - Action chart



Appendix D - Manual Mode

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The manual mode consists in use only the temperature regulation function of the FPP 5G/s jacket to perform manual tests of cooling behavior, for example to measure the pour point of a petroleum product (a manual CPP kit to install on the FPP exists).
These tests are carried out via the ***Jacket Preparation*** menu (screen 1 of the ***FPP Run / Start*** menu).

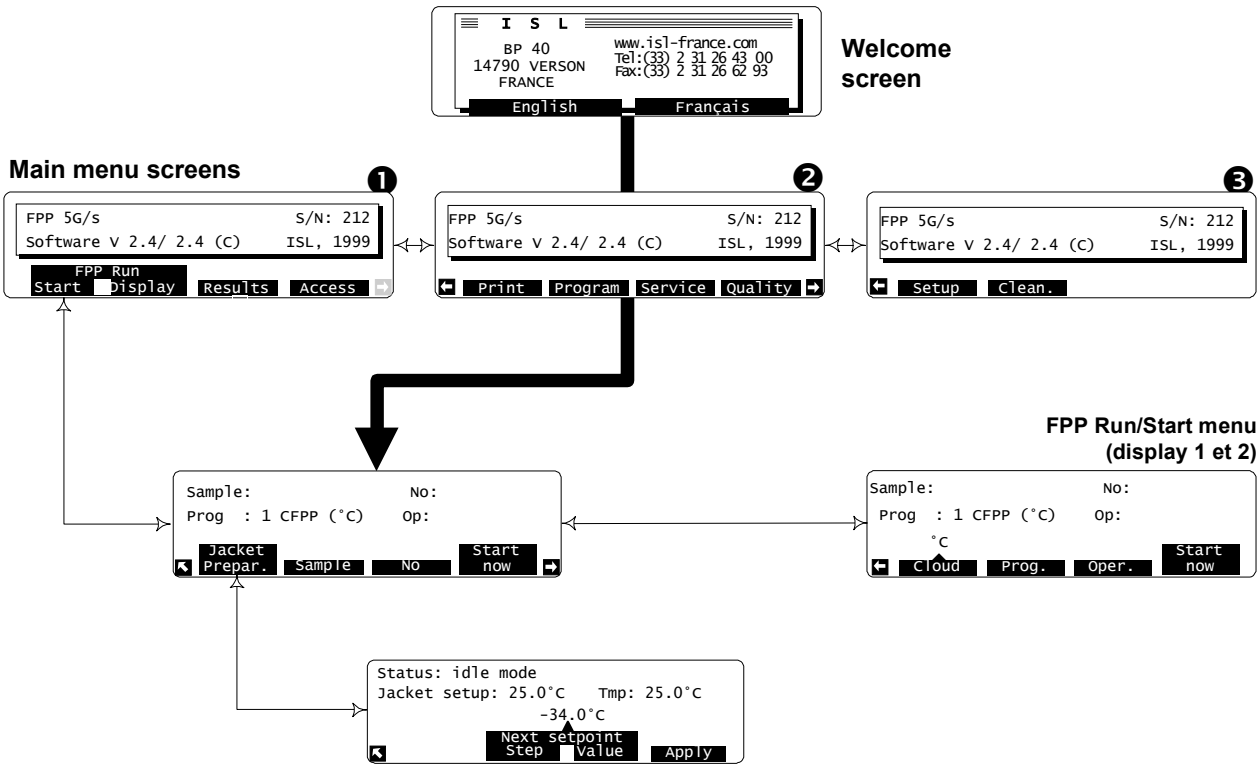

Diagram 9: Access to the Jacket Preparation menu

The cooling bath insulating of the FPP 5G/s, originally predicted for CFPP tests, has not been provided for long-term tests at low temperature (below –70°C). Ice should form around the bath in the analyzer and cause damages by melting.

CAUTION! The manual mode for measuring the cloud/pour point should not be used more than 4 or 5 times a year for tests at low temperatures (below –70°C). The test should not exceed 4 hours and the jacket temperature should not lower under –90°C.

Note: Beyond the number of test advised, if an insulating problem appears, the warranty could not be taken into account (after the opinion of the Customer Service).

1 - Preparing the test

Prepare the sample and the analyzer:

- Prepare the sample following recommendations of the standard method used for the manual test.
- Install the different elements necessary for carrying out the test in the FPP 5G/s analyzer bath in accordance with the recommendations of the standard method.
- Then using the Program menu of the FPP Run/Start menu display 2 (refer to the User Manual, Part 1 section 2.3 “Characterization of the sample”), select a prestored program on the analyzer to which a cooling profile with steps complying with the standard method is associated (refer to the Part 2 in the User Manual section 5.1 “Cooling profile: the Cooling profile menu” to visualize the parameters of a program).

You can use:

- A prestored cooling profile by selecting a program to which it is associated.
- A cooling profile specially created using ISL Alan® Software and downloaded into the analyzer.
- A prestored cooling profile in which the desired values will be entered (this profile will be used as a base, the values of steps entered will not be registered).

You also can modify a prestored cooling profile (refer to the User Manual, Part 2 section 5.1 "Cooling profile: the Cooling profile menu") if it contains enough number of step. Enter the cooling temperature of the bath indicated in the standard method used for each step. It is even possible to program the analyzer to reheating the sample at the end of test.

2 - Test running in manual mode

- Activate the ***FPP Run / Start*** menu of the main menu screen 1 (see Diagram 9 on the previous page).
  Note: The display of the ***FPP Run/Start*** menu is obtained at switching on the device or as soon as you have selected the language (if it has not been locked in the power on parameters). This measure has been taken to accelerate access to test-related menus.
- Activate the ***Jacket Prepar.*** menu of the **FPP Run/Start** menu, display 1. The following screen appears:

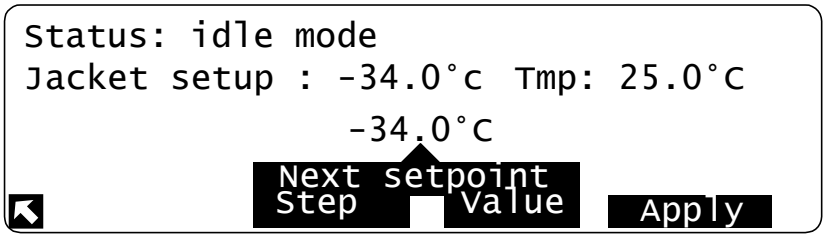

Figure 49: **Jacket Prepar.** *menu display*

The control program searches in the cooling profile of the program previously selected for the jacket setpoint temperature of the first step. It is displayed on the screen in the field located above the ***Next setpoint*** menu.

- If the setpoint displayed meets the requirement of the test, press the **APPLY** key.
- If the setpoint displayed do not meet the requirement of the test, enter the jacket temperature desired: press the **VALUE** key of the ***Next setpoint*** menu and enter the desired temperature value of the first step using the **NUMERIC KEYPAD**. Validate with the **ENTER** key then press the **APPLY** key.

The jacket temperature setpoint is then displayed in the "Jacket setup:" field and the actual jacket temperature appears in the "Tmp:" field (see Figure 49 above).

When the jacket temperature has reached the first step temperature programmed, the warning alarm is triggered (alarm used in the preparation of a standard CFPP test).

- Press the **ALARM STOP** key, the alarms displaying screen appears and the message "Jacket ready" is displayed. Acknowledge it by pressing the **ACQUIT** key.
- To reach the following step, press the **STEP** key of the ***Next setpoint*** menu. The setpoint temperature of the next step is displayed (it is not possible to make scrolling the different steps).
  As above, if the setpoint displayed do not meet the requirement of the test, enter the jacket temperature desired by pressing the **VALUE** key of the ***Next setpoint*** menu.
- Press the **APPLY** key to lower the jacket temperature up to the following step and continue the test.
  The new temperature setpoint appears in the "Jacket setup:" field. Proceed in this way until the test is completed.

If for any reason the manual test of pour point must be stopped, simply press on the **STOP/TEST** button on the front panel of the device. The control software will ask for confirmation of the command (refer to the User Manual). Then activate the **PREVIOUS LEVEL** button (the arrow on the left bottom). The effect of both these actions is to re-establish display 1 of the ***FPP Run / Start*** menu.

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